STOPPING WATER POLLUTION AT ITS SOURCE

MISA

Municipal/Industrial Strategy for Abatement

THE DEVELOPMENT DOCUMENT FOR THE EFFLUENT MONITORING REGULATION FOR THE IRON AND STEEL SECTOR

Environment Ontario

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Minister

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THE DEVELOPMENT DOCUMENT FOR THE EFFLUENT MONITORING REGULATION FOR THE IRON AND STEEL SECTOR

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FOREWORD

The Municipal/Industrial Strategy for Abatement (MISA) program is aimed at reducing discharges of toxic contaminants to Ontario's waterways. The ultimate goal of the MISA program is the virtual elimination of persistent toxic contaminants from all discharges to Ontario's receiving waters.

Under the MISA program, the monitoring requirements for each industrial sector are specified in two regulations - The General Effluent Monitoring Regulation (Ontario Regulation 695/88) and the relevant sector-specific regulation.

The General Effluent Monitoring Regulation provides the technical principles which are common to all sectors. It covers the "how to" items such as sampling, chemical analysis, toxicity testing, flow measurement and reporting.

The sector-specific regulation specifies the monitoring requirements of each direct discharger in the sector, such as the actual parameters to be monitored, the frequency of monitoring and the regulation in-force dates.

This document contains:

1. An overview of the iron and steel sector which includes descriptions of the Ontario Iron and Steel Sector plants.

2. The Technical Rationale document for the Iron and Steel Sector which describes the derivation of the monitoring parameters and the monitoring frequencies specified in the Effluent Monitoring Regulation for the Iron and Steel Sector.

3. The Effluent Monitoring Regulation for the Iron and Steel Sector.

4. Explanatory Notes which explain the legal terms used in the Regulation.

The General Effluent Monitoring Regulation, which must be used in conjunction with the sector specific regulation, is published under separate cover. The same document also includes a discussion of the MISA approach to effluent monitoring.

EXECUTIVE SUMMARY

The Iron and Steel Sector in Ontario consists of seven plants, four of which are integrated iron and steel mills where cokemaking, ironmaking, steelmaking and various finishing operations are carried out. Two plants produce carbon steel and one plant produces specialty steel using electric arc furnaces .

The basic principle of the monitoring Regulation is the building block concept where each iron and steel plant will monitor several process subcategories (blocks) so that on an industry wide basis all the process subcategories will be monitored.

The Technical Rationale provides the basis for the selection of parameters and the monitoring frequencies associated with each process subcategory stream and final effluent stream.

The Iron and Steel Sector Effluent Monitoring Regulation states the monitoring, toxicity testing, flow measurement and reporting requirements that each iron and steel plant must meet.

There are fifty-six effluent sampling points identified in the Regulation comprising 13 process subcategory effluent, 14 final effluent, 13 cooling water, 8 storm water effluent, 3 emergency overflow, 4 waste disposal site effluent and 1 storage site effluent sampling points.

The iron and steel effluent monitoring parameters have been assigned to integrated mills, specialty steel mills and mini-mills. There are 153 monitoring parameters for the integrated mills and 142 conventional and priority pollutants for the specialty steel mills and mini-mills. All final effluent streams will be monitored for chlorinated dibenzo-p-dioxins and dibenzofurans and polychlorinated biphenyls twice during the monitoring period of this Regulation.

Four characterizations, where target compounds will be analyzed (except for Dioxins and PCB's) and four open characterizations, where target and non-target compounds will be analyzed, will be carried out at each final effluent stream.

The four characterizations and the four open characterizations will be conducted during different months in order to gain insight into different plant operating conditions and seasonal variability of plant treatment processes.

Final effluent streams will be monitored daily for 4 parameters, three times a week for 12 parameters, weekly for 8 to 12 parameters, monthly for 86 parameters (specialty steel and mini-mills) and monthly for 117 parameters (integrated mills).

There is also provision made for additional weekly sampling to be carried out for a period of up to six months following the completion of the initial one year regulation monitoring period.

Explanatory Notes explain the legal text of the Effluent Monitoring Regulation in a simplified format which is similar to the format of the Effluent Monitoring Regulation.

PART I
OVERVIEW OF THE IRON AND STEEL SECTOR

PART I - OVERVIEW OF THE IRON AND STEEL SECTOR

I INTRODUCTION

The first part of this section serves as an introduction to the Iron and Steel Sector. It defines iron and steelmaking, provides a historical overview of the industry and describes general iron and steelmaking processes including wastewater generation and treatment.

The section concludes with specific information on each of the plants comprising the MISA Iron and Steel Sector. Emphasis is placed on the unique features of each site and the potential impact of operations on the environment.

II DEFINITION OF IRON AND STEELMAKING

In the basic iron and steelmaking process, coal is converted to coke which is then combined with iron ore and limestone in blast furnaces to produce iron. The iron is then converted into steel in either basic oxygen or electric arc furnaces. Following these steelmaking operations, the steel is subjected to a variety of hot and cold forming and finishing operations. These operations produce products of various shapes and sizes, and impart desired mechanical and surface characteristics.

III HISTORICAL OVERVIEW OF IRON AND STEELMAKING

The time when man first began to make ferrous metals by the reduction of iron ore is not known with certainty. However, it is believed that as early as 1350 BC to 1100 BC the ancient civilizations of Rome, Greece, Egypt and China were using ferrous metal products (1).

The following chronology highlights some of the important milestones in iron and steelmaking:

* About 1500 AD blast furnaces were used in England.

* In 1619, coke was used as a blast furnace fuel, however, its widespread use was not adopted until about 1730.

* In the early 1800's, the principle of heating air before it was blown into the blast furnace was introduced.

* In 1859, attempts were made to collect blast furnace gases before they flared and use them as fuel by leading them through suitable piping to ground level where they could be burned in special structures called stoves.

* By 1868 the use of open-hearth furnaces had become widespread in North America. These furnaces had acid resistent linings and sand bottoms for the hearths.

* In 1847, Henry Bessemer developed the principles of steelmaking where the oxidation of the major impurities occurred before the major oxidation of iron.

* In 1800, Sir Humphery Davy discovered the carbon arc which was the beginning of the arc-type furnace.

* The practical application of arc-type furnaces began with the work of Sir William Sienments who in 1878 constructed and operated both direct-arc and indirect-arc furnaces.

* Basic oxygen furnace steelmaking where oxygen is injected into the furnace vessel during the steelmaking process in order to speed up the rate of reaction started in 1955 and has since become the leading steelmaking process.

IV PRINCIPAL RAW MATERIALS

The principal raw materials used in the production of iron and steel are coal, limestone and dolomite and iron bearing materials (iron ore and pellets). Coal is used to produce coke and limestone and dolomite are used as fluxes to make furnace slags more fusible and to combine with unwanted impurities. Iron bearing materials are used to produce molten pig iron which is used in the steelmaking process.

V IRON AND STEELMAKING PROCESSES

Iron and steelmaking involves the conversion of coal to coke which is combined with iron ore and limestone in blast furnaces to produce iron. The iron is then converted into steel in either basic oxygen furnaces or electric arc furnaces. Following these steelmaking operations the steel is subjected to a variety of hot forming, cold forming and finishing operations. These operations produce products of various shapes and sizes and impart desired mechanical and surface characteristics.

Iron and steelmaking can be divided into the following process subcategories: Cokemaking, Sintering, Ironmaking, Steelmaking, Continuous Casting, Cold Forming, Hot Forming, Salt Bath Descaling and Acid Pickling.

SUBCATEGORY A: COKEMAKING

Cokemaking operations involve the production of coke in by-product coking ovens. The production of metallurgical coke is an essential part of the integrated steel industry since coke is one of the basic raw materials necessary for the operation of ironmaking blast furnaces.

Metallurgical coke is the residue from the destructive distillation of bituminous coal in the absence of air. Its main purpose is to supply a suitable fuel for use in an iron making blast furnace. As a result of the coking operation, there are three main by-products: coke oven gas, coal chemicals and coke breeze.

The 'fines' or coke breeze which remain after crushing and screening are recycled or reused as low-grade fuel. For every tonne of coke that is produced there are approximately 50 kg of coke breeze generated. A typical by-product coking operation is illustrated in Figure 1.

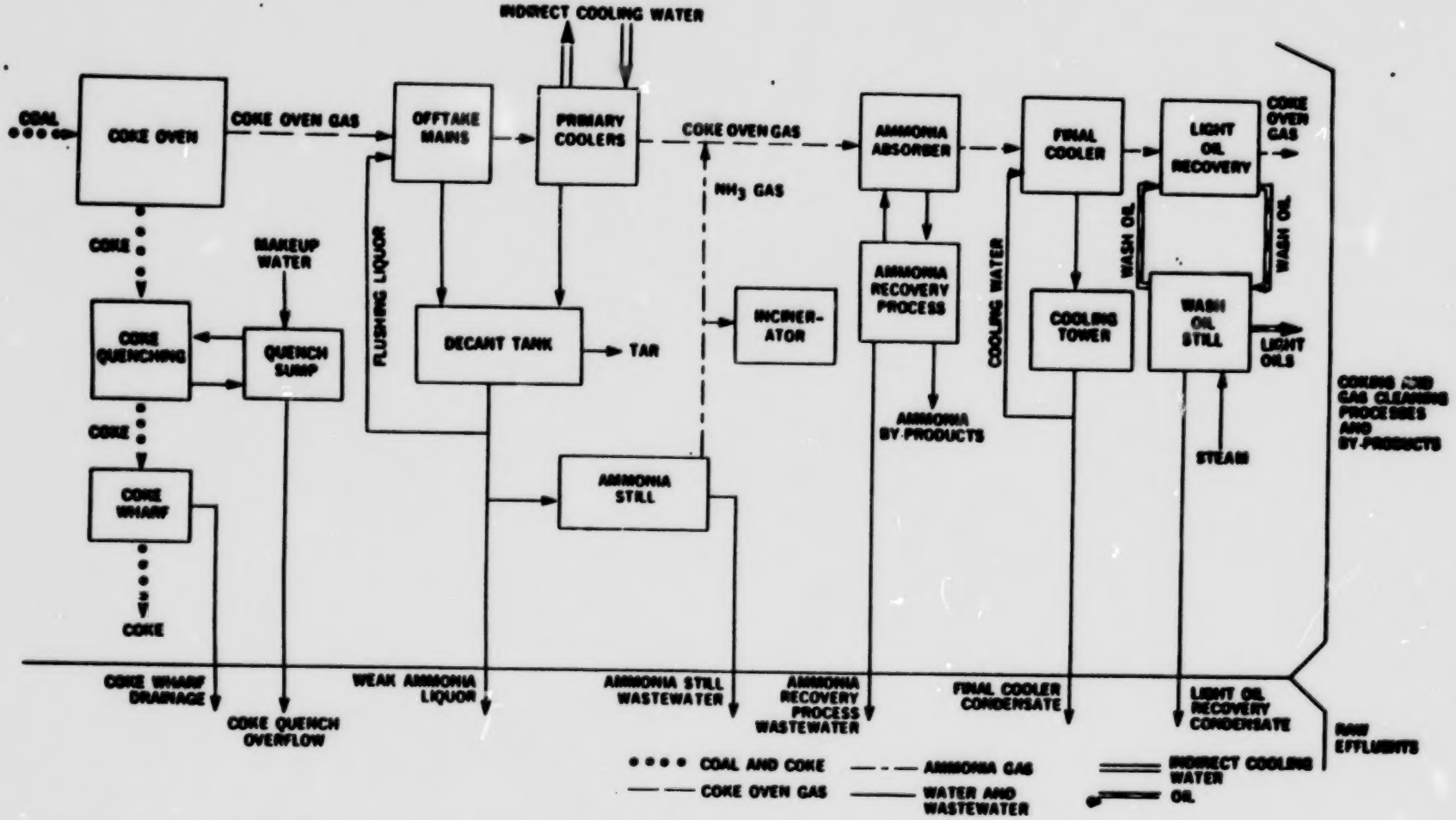

FIGURE I PROCESS FLOW DIAGRAM OF BY-PRODUCT COKE MANUFACTURE

In by-product coke ovens, the coke oven gas is collected, cleaned and reused as a fuel. Tar, light oil, ammonia and sulphur are recovered as by-products. Wastewaters may result from coke quenching and gas scrubbing operations.

SUBCATEGORY B: SINTERING

Sintering operations involve the production of an agglomerate which is used as one of the feed materials in the iron and steel making process. This agglomerate or "sinter" may be produced from ore fines and recycled materials such as mill scale and flue dust which have been generated by blast furnace and basic oxygen furnace operations and scale which has been recovered from hot forming operations.

Wastewaters are generated in sintering operations as a result of the scrubbing of dust and gases produced in the sintering process. Quenching and cooling of the sinter may generate additional wastewater.

SUBCATEGORY C: IRONMAKING

Ironmaking operations involve the reduction of iron bearing materials in the presence of limestone and coke in large cylindrical blast furnaces. The gases produced as a result of the ironmaking process are a valuable fuel. These gases are heavily laden with dust and require scrubbing prior to reuse. Blast furnace wastewaters are generated as a result of these cleaning operations.

Blast furnace wastewaters may be generated from air cleaning systems in stockhouses and dekishing stations. Stockhouses are where raw materials are mixed. Wet scrubbing systems or baghouses are used to remove particulate matter. Dekishing stations are where slag and residual iron are removed from hot metal cars. Slag can be cooled in a slag pit which is essentially a wet operation where any wastewater overflow has the potential to enter the waste stream. A slag pelletizing machine can also be used which requires controlled amounts of water. A typical blast furnace process flow is shown in Figure 2.

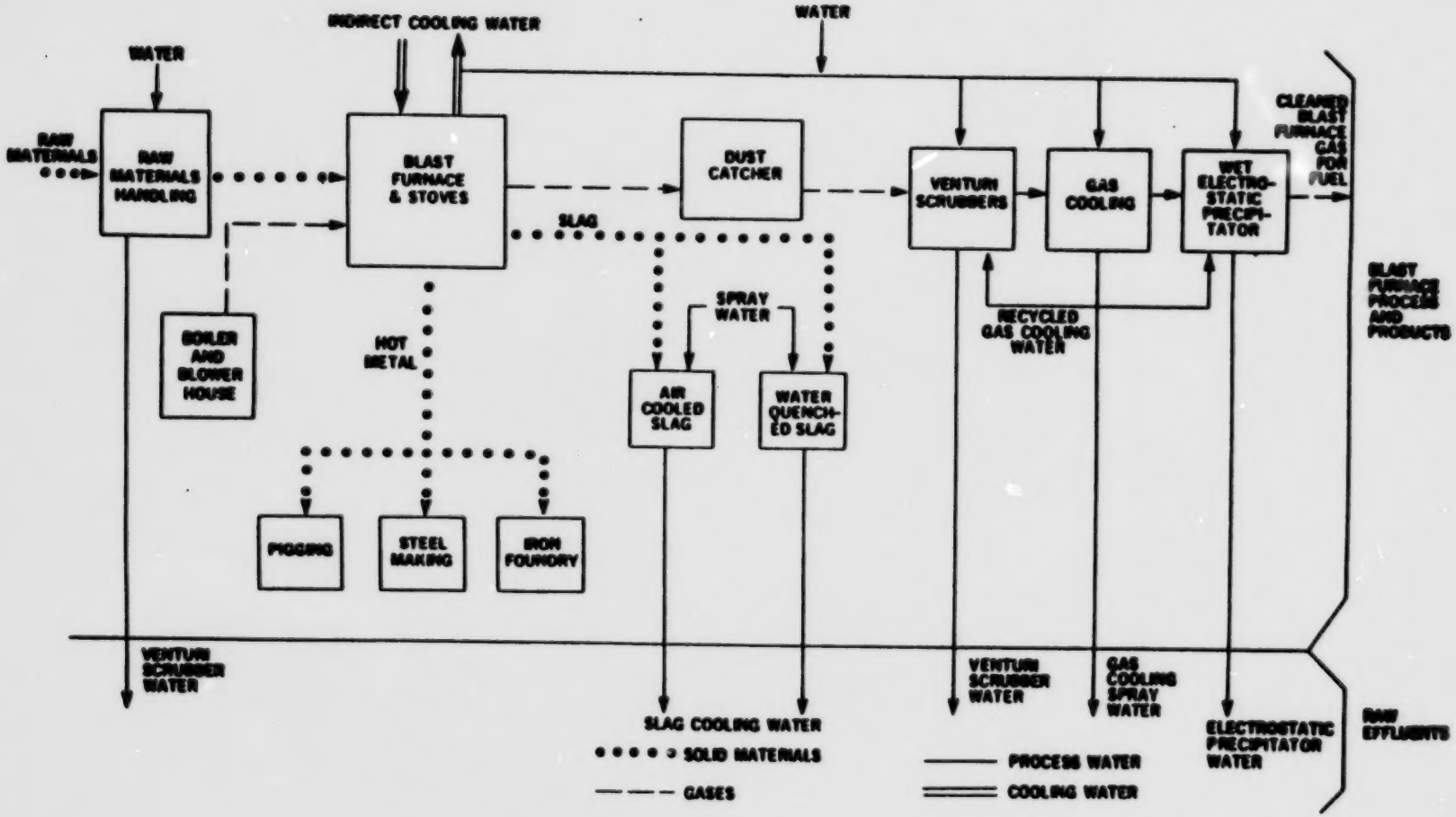

FIGURE 2 PROCESS FLOW DIAGRAM OF BLAST FURNACE OPERATIONS

SUBCATEGORY D: STEELMAKING

Steelmaking operations involve the production of steel in basic oxygen and electric arc furnaces. These furnaces generally receive iron produced in blast furnaces along with scrap metal and fluxing materials. Some electric arc furnaces use scrap only.

The fume, smoke and waste gases generated during steelmaking require cleaning prior to emission to the atmosphere. There are two types of gas cleaning operations: wet and dry. Steelmaking wastewaters are generated as a result of wet gas cleaning operations.

SUBCATEGORY E: CONTINUOUS CASTING

An additional process which is considered to be part of the 'steelmaking ' area is continuous casting. The continuous casting process is used to produce semi-finished steel directly from molten steel. The molten steel from the steelmaking operation is continuously cast into blooms, billets or slabs and may eliminate mould preparations, ingots and stripping operations. The semi-solidified steel is then sprayed with water. The water further cools the steel and removes scale from the steel surface.

SUBCATEGORY F: COLD FORMING

The cold forming process can be divided into two individual operations: cold rolling and cold tube forming.

Cold rolling is used to reduce the thickness of steel products. It produces a smooth dense surface and develops controlled mechanical properties in steel. Emulsified oils are used as metal working lubricants and are sprayed onto the steel materials as they enter the work rolls of the cold rolling mill. The steel materials may also be coated with oil prior to recoiling after they have passed through the mill. The oil prevents rust while the materials are in transit or in storage. Emulsified oils are the major pollutants in wastewaters resulting from this operation.

In the cold tube process, cold flat steel strips are formed into hollow cylindrical products. Wastewaters are generated as a result of continuous flushing with water or emulsified oil lubricants.

SUBCATEGORY G: HOT FORMING

Hot forming is the steel forming process in which hot steel is transformed in size and shape through a series of forming steps to produce semi-finished and finished steel products. Feed materials may be ingots, continuous caster billets or blooms and slabs from primary hot forming mills.

The hot forming mill is comprised of a group of rolling mills which have similar basic wastewater characteristics. These mills include:

Bloom Mill	Hot Strip Mill
Billet Mill	Rod and Bar Mill
Plate Mill	Structural Mill
Slabbing Mill	Rail Mill

In the hot forming process, the hot metal continuously oxidizes and forms scale which must be removed. High pressure water is used to clean the surface of the steel and as a result, wastewaters contain large quantities of scale. Wastewaters are also generated by continuously spraying contact cooling water over the steel rolls in order to keep them cool. Scarfing may be used to remove imperfections in order to improve the quality of steel surfaces. Scarfing generates fumes, smoke and waste gases which require scrubbing. Scrubbing of these fumes generates wastewater.

SUBCATEGORY H: SALT BATH DESCALING

Salt bath descaling is the operation in which specialty steel products are processed in molten salt solutions in order to remove scale. There are two types of scale removal processes (ie. oxidation and reduction operations). The oxidizing process uses highly oxidizing salt baths which react far more aggressively with the scale than with the base metal. This chemical action causes surface scale to crack so that subsequent pickling operations are more effective in scale removal. Reducing baths depend upon the strong reducing properties of sodium hydroxide. Oxides are reduced to base metal.

SUBCATEGORY I: ACID PICKLING

Acid pickling is the process of chemically removing oxides and scale from the surface of the steel by the action of water solutions and inorganic acids. The three major wastewater sources associated with acid pickling operations are spent pickle liquor, rinsewaters and the water used to scrub acid vapours.

Most carbon steels are pickled in either sulfuric or hydrochloric acids or mixtures of the two. Most stainless steels and alloy steels are pickled in mixtures of nitric, hydrochloric acids and hydrofluoric acids.

VI WASTEWATER

A wide variety and concentration of pollutants may be found in iron and steelmaking wastewaters including both conventional and persistent toxic contaminants.

Characteristics of untreated process wastewaters generated by the same process subcategories are similar among different plants of the iron and steel industry.

The production of coke from coal, molten iron from iron ore, steel from molten iron and finished products from molten steel is generally based on processes common to and typical of the iron and steel industry.

Differences in the characteristics of the treated effluents are anticipated depending upon the type of treatment that is used (ie physical/chemical or biological treatment or a combination thereof) (2).

The discharge of conventional and toxic pollutants can be controlled through a combination of in-plant controls and wastewater treatment.

VII IN-PLANT CONTROLS

In-plant controls are very cost effective methods of limiting the discharge of pollutants through process modifications, water reduction and recycling.

Process modifications include measures to improve the efficiency of unit operations thereby reducing the amount of pollutants discharged in the wastewaters.

Recovery of by-products through physical treatment processes or recycling or through the control of spills from process or storage areas will also reduce losses. Additionally, changes to process equipment will further reduce the discharge of contaminants to the environment.

Recycling cooling water and reducing water usage will also reduce contaminant losses.

VIII WASTEWATER TREATMENT

Both biological and physical-chemical treatment processes may be used to control the pollutants discharged in iron and steel wastewaters (1).

Biological treatment involves contacting the wastewater with microorganisms which metabolize the wastes for energy and synthesis of new cells. Metals and some hydrocarbons are removed in biological processes by adsorption onto the biological flocs which in turn are removed from effluents by clarification or filtration. Biological treatment technologies include extended aeration coupled with activated sludge systems and lagoons (2).

Physical-chemical treatment technologies utilized by the iron and steel industry include flow equalization, neutralization, oily water separation, sedimentation/clarification, filtration, coagulation, flocculation and steam stripping. Generally, these technologies are applied to recover products or by-products, to reduce loadings to a biological treatment plant or to remove pollutants for which biological treatment may be ineffective.

Cokemaking wastewaters include the following:

1. Coke quenching effluent
2. Excess weak ammonia liquor
3. Blowdown from gas recovery and collection
4. Overflow from the final coolers

Coke quenching effluent discharges have been eliminated from most iron and steel mills.

Excess weak ammonia liquor is treated by distillation using ammonia stills to recover ammonia (see Figure 1). In some mills, the still effluent and condensates from the light oil and final coolers are treated using biological treatment. Water from the final coolers is sometimes recycled as a means of minimizing discharge.

Ironmaking wastewaters which originate from the blast furnace area are commonly treated by clarification and/or recycled. In addition, some mills treat the blowdown from the clarifier overflow by using subsequent clarification or filtration to remove metals and suspended solids. The clarifier underflow is usually dewatered by using a rotary vacuum filter. The dewatered material is then recycled to the sinter plant, stockpiled or disposed.

Steelmaking wastewaters, which are generated as a result of using wet gas cleaning methods, are treated using clarification in order to remove suspended solids. These wastewaters are recycled at some of the iron and steel mills.

Hot forming wastewaters include direct roll cooling water, runoff table sprays and flume flushing water. As these wastewaters contain large amounts of scale, scale pits are generally used as a treatment step in the removal of the heavy scale particles and floating oils. Scale pit effluents are diverted to lagoons or filtration units and are recycled at some of the iron and steel mills.

Cold forming wastewaters include the following:

1. Pickle line fume scrubber wastewater
2. Waste pickle liquor or the blowdown from the regeneration process
3. Rinsewater from the pickling lines
4. Concentrated bath solutions
5. Blowdown from the waste rolling oil recovery systems

Pickle line fume scrubber wastewaters are usually treated by neutralization with lime and clarification. Generally, pickle line rinsewaters are recycled or treated and if waste pickle liquor regeneration is practiced the rinsewaters can be used as absorber feed in the regeneration plant.

Cold rolling solutions which contain waste oil are normally recycled with a blowdown. Waste oils from the mill are separated and removed from the blowdown in a treatment plant using a combination of pH adjustment, emulsion breaking and coagulation.

Final effluent wastewaters, which may be a combination of process subcategory effluents, cooling water effluents and stormwater effluents, are generally treated at centrally located facilities where a combination of physical/chemical and biological wastewater treatment methods may be used.

IX THE IRON AND STEEL SECTOR IN ONTARIO

The iron and steel industry in Canada consists of twenty one plants. The industry comprises five integrated mills, 15 mini-mills and one specialty steel producer.

Integrated mills consists of cokemaking, ironmaking, steelmaking, cold forming, hot forming and finishing operations. Mini-mills and specialty steel mills consist of steelmaking, hot forming and finishing operations

Eight of Canada's iron and steel plants are located in Ontario with seven of them classified as direct dischargers and included in the Iron and Steel Sector for regulation under the MISA program.

X SECTOR OVERVIEW

An overview of each of the Iron and Steel Sector companies is provided in this section. Information such as the location of the plant site(s), number of employees, products and raw materials, processes and effluent treatment is provided.

THE ALGOMA STEEL CORPORATION LIMITED

Algoma Steel is located in Sault Ste. Marie, Ontario, adjacent to the St. Marys River. The plant employs 8300 people and produces heavy structural and seamless tubular steel products and steel rails. In 1987, Algoma produced three million tonnes of steel.

Coal from four mining locations in West Virginia is converted into metallurgical coke in Algoma's six coke oven batteries. The coke is then combined with limestone, pelletized iron ore (from Wawa, Ontario and Ishpeming, Michigan) and sinter in four blast furnaces. Pig iron from the blast furnaces is converted into various grades of steel in Algoma's two basic oxygen furnaces. The steel is then formed into ingots or continuously cast for further processing at five hot rolling mills and four cold rolling mills.

Wastewaters from cokemaking processes are treated using ammonia recovery stills and settling basins. Wastewaters from ironmaking and steelmaking operations are treated using clarifiers. Wastewaters from Algoma's hot and cold rolling mills are treated using settling basins.

Wastewaters are discharged from the site through six outfalls to the St. Marys River at a rate of 500×10^3 cubic metres per day.

ATLAS SPECIALTY STEELS

Atlas Specialty Steels is located in Welland, Ontario, adjacent to the Welland River. The plant employs 1200 people and produces specialty steel products. These products include stainless, carbon, low and high alloy, tool, machinery and mining steels in billet and ingot form. In 1987, Atlas Specialty Steels produced 200,000 tonnes of steel.

Electric arc furnaces are used to melt scrap metal . Argon ladle refining, vacuum oxygen decarburizing and vacuum arc degassing are used to refine the steel melt. The steel is then continuously cast or subject to top pour ingot teeming or bottom pour ingot teeming. Surface imperfections are removed from billets and ingots in conditioning operations prior to further processing.

The steel undergoes either forging or hot rolling. Hot rolling consists of primary rolling to produce blooms, billets and large bars and secondary rolling to produce specialty steel shapes. Following the forging and hot rolling processes, the steel may undergo heat treating, machining or cold finishing.

Waste effluent is treated by two wastewater filtration/reclamation plants and a waste acid treatment/solidification plant. The two wastewater filtration/reclamation facilities are credited with reducing total plant water consumption by 27% through increased recirculation.

Wastewater is discharged from the site through one outfall to the Welland River at a rate of 35×10^3 cubic metres per day.

DOFASCO

Dofasco is located in the City of Hamilton, Ontario, adjacent to Hamilton Harbour. The plant employs 11,600 people and produces flat rolled, cold rolled, galvanized, galvalume, tinplate, and silicon electrical steel.

Production of steel ingots and castings have totalled more than 4.5 million tonnes annually. Shipments of flat rolled product, semi-finished steel and steel castings amount to more than 3.4 million tonnes per year.

Coal is converted into metallurgical coke in Dofasco's six coke oven batteries. The coke is then combined with limestone, iron ore in four blast furnaces. Pig iron from the blast furnaces is converted into steel in Dofasco's four basic oxygen furnaces. The steel is then continuously cast for further processing at two hot strip mills and five cold rolling mills.

Dofasco has four temper mills, four pickle lines, four galvanizing/galvalume lines, two electrolytic tinning lines and two silicon electrical steel lines to further condition the steel.

Coke production wastewater is treated using ammonia recovery stills and a biological treatment plant.

Wastewaters from ironmaking and steelmaking processes are treated by clarification. Hot strip mill wastewaters and wastewaters from the continuous casting mill are treated by two filtration plants which work on the principle of deep bed filtration and water recycle.

Wastewaters from the cold rolling mills, temper mills, pickle lines, galvanizing lines, electrolytic lines and silicon electrical steel lines are treated by neutralization, clarification and oil removal operations prior to being discharged for further treatment at the Regional Sewage Treatment Plant.

Dofasco has installed two acid regeneration plants and an ion exchange system to treat waste solutions of hydrochloric acid from the pickle lines and chromic acid solutions from the electrolytic tinning lines respectively.

Wastewaters are discharged through five outfalls to Hamilton Harbour at a rate of 861×10^3 cubic metres per day, seventy percent of which is non-contact cooling water.

IVACO ROLLING MILLS

Ivaco Rolling Mills is situated in L'Orignal, Ontario, adjacent to the Ottawa River. The plant employs 600 people and produces billets in a comprehensive range of high and low carbon steel grades. In 1987, Ivaco Rolling Mills produced 500,000 tonnes of steel products.

Two electric arc furnaces are used to melt steel scrap which is then continuously cast into steel billets. The billets are hot rolled into wire rods and are sent to markets all over North America.

Wastewater is treated using scale pits, filters and oil skimming systems. There is no discharge of process wastewaters since they are recycled. Non-contact cooling waters and storm waters are discharged from the site through one outfall to Mill Creek which empties into the Ottawa River.

LAKE ONTARIO STEEL COMPANY LIMITED (LASCO)

LASCO is located in Whitby, Ontario adjacent to Lake Ontario. The plant employs 1100 people and produces low carbon steel grade products. In 1987, LASCO produced 660,000 tonnes of steel products.

LASCO uses electric arc furnaces to melt scrap steel. The molten steel is cast into billets and is then hot rolled into final products.

LASCO uses water in both cooling water systems and process water systems. Cooling water systems recirculate water to electric arc furnaces, caster molds, reheat furnaces and furnace equipment. These systems are closed ones where cooling waters do not come into contact with production materials.

Process water systems supply casting sprays, direct evaporative spray chambers, mill and bar cooling operations, old caster cooling equipment, and descalers.

Wastewaters are treated using scale pits, filters and oil skimming systems and are discharged to Lake Ontario at a rate of 25×10^3 cubic metres per day.

STELCO INC.

In 1987, Stelco Inc. produced about 5 million tonnes of steel products. Stelco Inc. employs 10,580 people at its Hilton works and Lake Erie works.

I. STELCO STEEL - HILTON WORKS

Stelco Steel's Hilton Works is located in Hamilton, Ontario, adjacent to Hamilton Harbour. The plant produces plate flat rolled, cold rolled, galvanized, tin plate and bar products and shaped steel.

Coal is converted into metallurgical coke in Stelco's five coke oven batteries. The coke is then combined with limestone, iron ore and sinter in three blast furnaces. Iron from the blast furnaces is converted into various grades of steel in three basic oxygen furnaces. The steel is then formed into ingots or continuously cast by two continuous casters for further processing at the hot rolling mills.

The primary hot rolling mills consist of slabbing mills and bloom and billet mills. The secondary hot rolling mills consist of bar mills, strip mills and rod and plate mills.

There are also strip finishing and strip cleaning operations, cold rolling mills and temper mills, annealing processes, sheet coating processes involving galvanizing, tin lines and finishing facilities.

Wastewater treatment has been achieved through sewer separation, water recycle, treatment for specific contaminants and combined final treatment including filtration.

Wastewaters from ironmaking processes are recycled with any blowdown and receive treatment at the East Side Final Treatment Plant. The East Side Final Treatment Plant consists of two sedimentation basins followed by filtration.

Wastewaters from primary mills and hot rolling mills are treated using scale pits and flow to the East Side Final Treatment Plant. Most of the cooling water from the hot rolling mills is cascaded and is used for scale flushing where it becomes a source of process water.

Emulsified oils from cold rolling operations and recovered oils from all other parts of the plant are processed in an oil/water separation plant. The separated water flows to the East Side Final Treatment Plant.

Spent acid from hydrochloric acid pickling lines is treated at a hydrochloric acid regeneration plant and is then reused. Rinse water from the tin lines is processed in an ion exchange plant to remove chrome and the water is recycled.

Wastewaters are discharged from the site though seven outfalls to Hamilton Harbour at a rate of 1.1×10^6 cubic metres per day.

II. STELCO STEEL - LAKE ERIE WORKS

Stelco Lake Erie Works is located in Nanticoke, Ontario, adjacent to Lake Erie. The plant produces both finished steel for customers and semi-finished steel for further processing at the Hilton Works plant of Stelco Steel.

Coal is converted into metallurgical coke in coke ovens. The coke is then combined with limestone and iron ore in blast furnaces. Iron from the blast furnaces is converted into various grades of steel in basic oxygen furnaces. The steel is then continuously cast for further processing at hot rolling mills.

The plant was designed to incorporate state of the art wastewater recycle and treatment concepts. There are separate sewers for sanitary, process, storm and cooling waters. Process water and clean non-contact cooling water are recycled. As a result water discharge is minimized.

A limited blowdown from recycled systems is required to discharge hardness received form the supply water. Blowdown receives secondary treatment in a blowdown treatment system which includes primary solids removal, flocculation, clarification and alkaline breakpoint chlorination. Polishing filtration is provided for all flow through the plant.

Tertiary wastewater treatment is achieved in a final terminal settling basin where up to 7 days hydraulic retention time is provided. This terminal basin also provides extended settling time for storm water during storm events.

There are gathering and holding facilities for drainage from raw material storage areas with provision for recycle as a dust suppressant on the storage piles. There are other holding basins throughout the plant to permit bypasses from individual recycle systems in a case of upset or spill conditions.

Treated wastewater from the blowdown treatment plant is discharged at a rate of 40,000 cubic metres per day to a stabilization pond and then to Lake Erie via Centre Creek.

PART II
TECHNICAL RATIONALE FOR THE MONITORING REQUIREMENTS

PART II- TECHNICAL RATIONALE FOR THE MONITORING REQUIREMENTS

I INTRODUCTION

The purpose of the technical rationale section is to explain the steps in the development of the Iron and Steel Sector Effluent Monitoring Regulation.

The section provides background information on the regulation process, the Iron and Steel Sector monitoring approach and the databases and criteria used for parameter and monitoring frequency selection.

II DEFINITION OF THE IRON AND STEEL SECTOR

The Iron and Steel Sector in Ontario includes integrated mills, specialty steel mills and mini-mills that are involved in several or all of the production processes used in the manufacturing of iron and steel.

There are seven Iron and Steel Mills in Ontario. Four of these mills are integrated iron and steel works (ie. Algoma Steel, Stelco Hilton Works, Stelco Lake Erie Works and Dofasco) while the remaining three mills are specialty steel mills or mini-mills which use electric arc furnaces (ie. Lasco, Ivaco and Atlas Steel).

III THE NEED FOR REGULATION

Process effluents from the Iron and Steel Industry may contain ammonia, cyanide, phenolics (4AAP)s, suspended solids, oil and grease, PAH's, volatiles (mainly benzene) and heavy metals (ie. zinc, iron, lead, and chromium). With the large volumes of effluent that are generated during iron and steel making processes, the loadings of these contaminants to receiving watercourses can cause negative environmental impacts.

Currently, the Iron and Steel Sector plants monitor and report to the Ministry of the Environment only certain standard parameters and conventional pollutants under the Ministry's Industrial Monitoring Information System (IMIS).

The reportable data include effluent flow and may include pH, chemical oxygen demand (COD), ammonia, cyanide, total phosphorus, total suspended solids (TSS), total dissolved solids (TDS), volatile suspended solids (VSS), phenols, sulphides, oil and grease and selected metals.

Site specific IMIS data are published by the Ministry in its annual report entitled "Report on the Industrial Direct Dischargers in Ontario" (3). The IMIS data are reported to the Ministry on a voluntary basis and are recorded as monthly averages.

There are currently no regulations in Ontario for specific, toxic and persistent pollutants, generally termed "priority pollutants". In fact, there exists only a very limited data base on the concentrations and loadings of these priority pollutants being discharged into Ontario's waterways.

The MISA effluent monitoring regulation for the Iron and Steel Sector will provide a comprehensive long term data base on the discharges of priority pollutants from the iron and steel sector plants.

This data base will be used in conjunction with other environmental studies and historical data to set effluent limits on the discharge of these pollutants to our waterways.

IV THE U.S. EPA EXPERIENCE

The United States Environmental Protection Agency (EPA) promulgated Effluent Limitations and Standards for the Iron and Steel Industry in the United States in 1986 (4).

The Agency studied the iron and steel industry to determine whether differences in raw materials, final products, manufacturing processes, equipment, age and size of plants, water usage, wastewater constituents, and other factors justified the development of separate effluent limitations and standards for different segments of the industry.

The Agency collected information concerning production processes, production capacity and rates, process water usage, wastewater generation rates, wastewater treatment and disposal methods, treatment costs, location, age of production and treatment facilities, as well as analytical information on influent and effluent quality from 391 steelmaking operations and 1,632 steel forming and finishing operations.

Detailed information was collected on long term effluent monitoring data and specific production operations from 50 basic steelmaking facilities and 128 forming and finishing facilities.

To determine the presence and level of conventional and priority pollutants in iron and steelmaking effluents, the Agency conducted effluent and flow measurement monitoring at representative iron and steel plants. The Agency conducted a two part sampling and analysis program at 31 basic steelmaking facilities and 83 forming and finishing facilities .

After an extensive review of the data that was obtained from these studies, the Agency adopted a scheme based on process subcategorization. Process-based subcategorization was warranted because:

- the data suggested that similar iron and steel process subcategories produce wastewaters with similar characteristics regardless of mill location;
- it accurately reflects production operations;
- the wastewaters of different processes contain different pollutants requiring treatment by different control systems;
- the process water usage and wastewater flows for the iron and steel sector vary significantly among different process subcategories thus affecting the type of treatment used;

Average wastewater concentrations and loadings for each conventional and priority pollutant were determined for each process subcategory. These concentrations and loadings were used to determine the United States EPA Effluent Limits for each process subcategory.

The United States Iron and Steel Effluent Limits Regulation controls the discharge of sixteen pollutants: nine priority pollutants and seven conventional pollutants. The data available to the Agency generally showed that the control of these pollutants would result in the comparable control of toxic pollutants not specifically limited.

The Agency stated that by establishing specific limitations for indicator pollutants only, the high cost and delays of monitoring and analysis that would result from limitations for each pollutant would be significantly reduced.

The sixteen pollutants limited by the United States Iron and Steel Effluent Limits Regulation are:

Ammonia	Nickel
Benzene	Naphthalene
Benzo(a)pyrene	Oil and Grease
Chlorine Residual	pH
Chromium	Phenolics (4AAP)
Cyanide	Tetrachloroethylene
Hexavalent Chromium	Total Suspended Solids
Lead	Zinc

These pollutants were assigned to specific iron and steel sector process subcategories based upon the analytical data gathered by the Agency, the environmental impact of each pollutant, the ability of the compound to serve as an "indicator" for the presence of other pollutants and the treatability of each compound. For example, ammonia, cyanide, phenolics (4AAP), benzene, naphthalene, and benzo(a)pyrene were assigned to cokemaking operations. The U.S. EPA set limits for each of these compounds and stated that these limits could be achieved at all cokemaking process subcategory operations.

V THE MINISTRY/IRON AND STEEL SECTOR DIALOGUE

The Ministry adopted an open consultative process both with industry and the public in developing the Iron and Steel Sector Effluent Monitoring Regulation. Public input was available in the Regulation formulating process through the MISA Advisory Committee (MAC). Members of the committee were appointed by the Minister of the Environment on the basis of their knowledge, concern and expertise in matters dealing with the environment.

A Joint Technical Committee (JTC) consisting of Industry, Environment Canada and Ministry representatives served as the means for reaching consensus. A member of the MISA Advisory Committee also took part in JTC discussions.

Agreement was reached with Industry on principles which were to serve as general guidelines for the effluent monitoring regulation. A multi-discipline group of Ministry/Environment Canada/Industry experts developed the general rationale for the site-specific monitoring requirements. A joint Ministry/Industry Regulation Writing team then produced the Regulation text for review by the JTC.

On the basis of the rationale and the databases available to the Ministry, monitoring requirements were drawn up. The monitoring requirements were then reviewed for each plant site and were modified where required.

VI THE PROCESS SUBCATEGORY EFFLUENT MONITORING APPROACH

In limiting the discharges from iron and steelmaking industries in the United States, the U.S. EPA has imposed limits on effluents discharging from specific iron and steel process subcategories after a treatment. This approach effectively sets limits on process subcategory effluent streams prior to their dilution with cooling water.

The MISA pre-regulation monitoring program made use of the same process subcategory approach as that taken by the U.S. EPA. Representative process subcategory effluent streams were monitored for a list of both conventional and priority pollutants. Effluent streams were monitored after a treatment but prior to final treatment.

The Ontario Iron and Steel Sector Effluent Monitoring Regulation is consistent with the U.S. EPA approach and requires the monitoring of process subcategory effluents after treatment, prior to dilution with cooling water and prior to final treatment.

Ontario iron and steel mills have different combinations of process subcategory effluents depending upon the nature of their manufacturing operations. Because of the consistent nature of these process subcategory effluents in terms of effluent characteristics, representative process subcategory effluent streams will be monitored under the Iron and Steel Effluent Monitoring Regulation. Some mills will, therefore, not have to monitor a process subcategory effluent stream if a representative one is being monitored at another mill, provided that the method of treatment for both process subcategory effluents is the same.

In addition, iron and steel mills that do not have final treatment facilities are required to monitor all process subcategory effluent stream types.

Each mill will monitor several process subcategory effluent streams. On an industry wide basis, at least one representative effluent stream will be monitored from each process subcategory in those cases where similar effluent treatment methods are used and at least two representative effluent streams in those cases where different methods of effluent treatment are used. This will provide on-going validation of the approach chosen, as well as providing an indication of the effectiveness of one method of treatment versus another.

All final effluent streams will be monitored at each iron and steel mill. Final effluent will be monitored in order to determine contaminant loadings to the receiving watercourses and to facilitate comparisons of the treatment methods applied across all of the mills. These comparisons will provide the basis for the development of treatment technology-based effluent limits.

The routine monitoring requirements for each type of process subcategory effluent will be consistent across the mills and will reflect the nature of the processes and materials involved in that process subcategory.

The monitoring requirements for each final effluent stream are different for each mill. The requirements reflect those imposed on each of the process subcategory effluent streams which contribute to that final effluent stream.

Toxicity testing of each final effluent is also required and provides a correlation with the chemical monitoring data.

VII DATABASES USED FOR PARAMETER SELECTION

A voluntary pre-regulation monitoring program was established with the iron and steel sector to assess the effluent characteristics of similar unit operations or process subcategories in Ontario iron and steel plants.

The primary objective of the pre-regulation monitoring program was to provide a data base on the effluent quality fo iron and steel mill process subcategory and final effluent streams.

The methods of cokemaking, ironmaking, steelmaking (wet) and other steel finishing operations are similar among different iron and steel mills. The pre-regulation monitoring program was, therefore, focused on obtaining information from representative process subcategory effluents as well as from final effluents.

In applying this monitoring strategy, it was necessary to monitor some of the effluent streams that discharge to municipal sewer systems (ie. indirect dischargers) in order to obtain representative monitoring data on each type of process subcategory effluent.

In addition to pre-regulation monitoring data, environmental studies by the United States EPA (4) and studies such as the Upper Great Lakes Connecting Channels Study (5), the St. Mary's River MISA Pilot Site Study (6), the study on Point Source Loadings of Priority Pollutants to and from Hamilton Harbour (7), the Niagara River Toxic Committee Report (8) and

the Impact of Hamilton Harbour on Western Lake Ontario study (9) along with surveys conducted by Environment Canada on selected Iron and Steel Mills (10) provide data from which it is possible to construct a comprehensive database on iron and steel effluent quality.

VIII PRE-REGULATION MONITORING

Wastewater samples were collected during November, 1987 to May, 1988. Industrial intake waters were also monitored to determine the presence of conventional as well as priority pollutants. Priority pollutants are defined as those chemicals which are included on the Effluent Monitoring Priority Pollutants List (11).

The Effluent Monitoring Priority Pollutants List (EMPPL) includes those chemicals detected or potentially present in Ontario municipal and industrial effluents and in Ontario waterways which pose a hazard to the receiving waterway and which pose a hazard to the receiving environment because of their toxicity and persistence.

During the pre-regulation monitoring study, samples were collected from representative effluent streams of each process subcategory. A mill was not required to monitor a process subcategory effluent stream if a representative stream was monitored at another mill. The number of samples collected ranged from two samples for cold forming process subcategory operations to eleven samples for cokemaking process subcategory operations. Wastewaters from cokemaking operations contain a wide variety of organic and inorganic pollutants and emphasis was, therefore, focused on monitoring these effluent streams. Other effluent streams such as final effluent streams, cooling water streams and storage site effluent streams were monitored on a site specific basis.

Samples consisted of four aliquot composites collected over a six hour period. All samples were analyzed for conventional parameters and for those parameters on the Effluent Monitoring Priority Pollutants List (EMPPL) that have known laboratory protocols. In addition, split samples were collected from selected effluent streams and analyzed by the Ontario Ministry of the Environment laboratory.

Appendix I, Table 1 shows the total number of effluent characterizations performed on process subcategory and final effluent streams. Sixty-two effluent characterizations (51 by industry and 11 by the MOE) were completed on effluents from the six iron and steel plants. Analyses for chlorinated dibenzo-p-dioxins and dibenzofurans were conducted on twelve effluent streams.

It should be noted that fifteen tests for the presence of dibenzo-p-dioxins and dibenzofurans were conducted by the Iron and Steel Sector and the Ministry of the Environment during the pre-regulation monitoring study. None of these tests indicated the presence of dioxins and furans in iron and steel mill effluent.

Open characterizations were conducted by the iron and steel sector on 5 process subcategory effluent streams, 1 final effluent stream and 1 storage site effluent stream.

The frequency of detection of compounds on EMPPL for each process subcategory and final effluent stream are shown in Appendix I, Table 2.

The following analytical test groups contain priority pollutant parameters that were detected in process subcategory and final effluent streams during the pre-regulation monitoring study in concentrations greater than their Ministry of the Environment Analytical Method Detection Limits:

Total Metals	(ATG 9)
Hydrides	(ATG 10)
Mercury	(ATG 12)
Halogenated Volatiles	(ATG 16)
Non-halogenated Volatiles	(ATG 17)
Base Neutral Extractables	(ATG 19)
Acid Extractables	(ATG 20)
Chlorinated Neutral Extractables	(ATG 23)

Appendix I, Table 3 shows the parameters in process and final effluent streams that were detected above the Ministry of the Environment's Analytical Method Detection Limits during the pre-regulation monitoring study.

The following analytical test groups were not monitored during the pre-regulation monitoring study:

Group 13 (Total Alkyl Lead)
Group 21 (Extractables, Phenoxy Acid Herbicides)
Group 22 (Extractables, Organochlorine Pesticides).

Analytical test groups 13, 21 and 22 are not used in or generated by iron and steelmaking processes. In addition, these test groups were not considered by the U.S EPA during the development of their Effluent Limitations, Guidelines and Standards (4).

IX PARAMETERS FOR ROUTINE MONITORING

This section deals with the development and use of the Iron and Steel Sector List and the Parameters for Routine Monitoring List.

The Iron and Steel Sector List includes the analytical test groups that contain the conventional and priority pollutants that are found in iron and steelmaking process subcategory and final effluent streams. The Sector List is based on pre-regulation monitoring data, United States Environmental Protection Agency (EPA) data, historical data and technical knowledge of iron and steelmaking processes.

The Sector List is used for the purposes of effluent characterization (see Section XIX).

A subset of the Iron and Steel Sector List is the Parameters for Routine Monitoring List. The Parameters for Routine Monitoring List consists of chemicals that are currently regulated by the U.S EPA for the iron and steel industry. These parameters are included on the EMPPL and are referenced as being detected in iron and steel mill effluents in Ontario.

Parameters for routine monitoring are analyzed frequently to establish an effluent database. The United States EPA has found that by limiting the discharge of these parameters in final effluent streams, effective control is provided for toxic pollutants. Parameters for routine monitoring are assigned to specific process subcategories based on pre-regulation monitoring data and on technical knowledge of individual processes.

The Iron and Steel Sector List

The Iron and Steel Sector List is made up of analytical test groups which include the pollutants that were detected during pre-regulation monitoring and which historical data have indicated are present in wastewaters from iron and steelmaking industries.

The Iron and Steel Sector List contains analytical test group 24 (Chlorinated Dibenzo-p-dioxins and Dibenzofurans) and analytical test group 27 (Polychlorinated Biphenyls). There is no historical data to suggest that iron and steelmaking processes produce contaminants that belong to either of these two analytical test groups. However, the industry will monitor for these contaminants because of their environmental importance.

The Iron and Steel Sector list consists of the following analytical test groups:

Group 2	Cyanide
Group 3	Hydrogen Ion (pH)
Group 4a	Nitrogen (Ammonia plus Ammonium and Total Kjeldahl Nitrogen)
Group 4b	Nitrogen (Nitrate + Nitrite)
Group 5a	Organic Carbon (Dissolved Organic Carbon)
Group 5b	Organic Carbon (Total Organic Carbon)
Group 6	Total Phosphorus
Group 7	Specific Conductance
Group 8	Suspended Solids
Group 9	Total Metals
Group 10	Hydrides
Group 11	Chromium Hexavalent
Group 12	Mercury
Group 14	Phenolics
Group 15	Sulphide
Group 16	Volatiles, Halogenated
Group 17	Volatiles, Non-Halogenated
Group 19	Base Neutral Extractables
Group 20	Acid Extractables
Group 23	Extractables, Chlorinated
Group 24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans
Group 25	Solvent Extractables
Group 26	Fatty and Resin Acids
Group 27	Polychlorinated Biphenyls

Chemical oxygen demand (analytical test group 1) is not included on the Iron and Steel Sector List because it is not as specific an indicator for iron and steel effluent quality as Dissolved Organic Carbon (analytical test group 5a). Dissolved organic carbon measures the soluble organic carbon and can be detected at a lower detection limit.

As previously mentioned, total alkyl lead (analytical test group 13), herbicides (analytical test group 21), and pesticides (analytical test group 22) are not produced by iron and steelmaking processes and are, therefore, not included on the Iron and Steel Sector List.

Water Soluble Volatiles (analytical test group 18) were not detected in the 48 samples that were analyzed during the pre-regulation monitoring study. Therefore, analytical test group 18 is not included on the Iron and Steel Sector List.

Analytical test groups from the Iron and Steel Sector List that contain priority pollutants have been assigned to specific process subcategories based on:

* parameters that exceeded their Ministry of the Environment Analytical Method Detection Limits during the pre-regulation monitoring study
* United States Environmental Protection Agency (EPA) data
* technical knowledge of the individual processes.

These analytical test groups are monitored in order to establish the presence/absence of toxic compounds and to identify possible candidate compounds for high frequency monitoring and control.

The analytical test groups from the Iron and Steel Sector List that contain priority pollutants have been assigned as follows:

Cokemaking	Total Metals	(ATG 9)
	Hydrides	(ATG 10)
	Mercury	(ATG 12)
	Halogenated Volatiles	(ATG 16)
	Non-halogenated Volatiles	(ATG 17)
	Base Neutral Extractables	(ATG 19)
	Acid Extractables	(ATG 20)
	Chlorinated Neutral Extractables	(ATG 23)
Ironmaking	Total Metals	(ATG 9)
	Hydrides	(ATG 10)
	Halogenated Volatiles	(ATG 16)
	Non-halogenated Volatiles	(ATG 17)
	Acid Extractables	(ATG 20)
Sintering	Total Metals	(ATG 9)
	Hydrides	(ATG 10)
	Halogenated Volatiles	(ATG 16)
	Non-halogenated Volatiles	(ATG 17)
	Acid Extractables	(ATG 20)
Steelmaking (wet)	Total Metals	(ATG 9)
	Halogenated Volatiles	(ATG 16)
	Base Neutral Extractables	(ATG 19)
	Acid Extractables	(ATG 20)
	Chlorinated Neutral Extractables	(ATG 23)
Hot Forming	Total Metals	(ATG 9)
	Halogenated Volatiles	(ATG 16)
	Base Neutral Extractables	(ATG 19)
	Chlorinated Neutral Extractables	(ATG 23)

Cold Forming	Total Metals	(ATG 9)
	Hydrides	(ATG 10)
	Halogenated Volatiles	(ATG 16)
	Chlorinated Neutral Extractables	(ATG 23)
Acid Pickling	Total Metals	(ATG 9)
	Hydrides	(ATG 10)
	Halogenated Volatiles	(ATG 16)
	Chlorinated Neutral Extractables	(ATG 23)
Salt Bath Descaling	Total Metals	(ATG 9)
	Hydrides	(ATG 10)
	Hexavalent Chromium	(ATG 11)
	Halogenated Volatiles	(ATG 16)
	Chlorinated Neutral Extractables	(ATG 23)

The Iron and Steel Parameters for Routine Monitoring List

The Iron and Steel Parameters for Routine Monitoring List consists of those chemicals, with the exception of tetrachloroethylene and chlorine residual, that are currently regulated by the United States Environmental Protection Agency for the U.S. Iron and Steel Industry.

Tetrachloroethylene was deleted from the Parameters for Routine Monitoring List because it was not detected at any of the sampling locations during the preregulation monitoring study and it is not used by any of the iron and steel mills in Ontario.

Chlorine residual was deleted from the Parameters for Routine Monitoring List because of the analytical interference of other compounds such as halogens during laboratory analysis. Interference may result in extraordinarily high levels of chlorine residual which could be misleading.

It should be noted that iron is not regulated by the U.S. EPA or considered as a parameter for routine monitoring because iron is not an "indicator" parameter for the presence of other metals and is not a priority pollutant like chromium, hexavalent chromium, lead, nickel and zinc.

The following compounds make up the Parameters for Routine Monitoring List for the Ontario Iron and Steel Sector:

Ammonia
Benzene
Benzo(a)pyrene
Chromium
Cyanide
Hexavalent Chromium
Lead
Naphthalene
Nickel
Oil and Grease
pH
Phenolics (4AAP)
Suspended Solids
Zinc

Although most of the total metals were found frequently, zinc, lead, chromium and nickel were selected as parameters for routine monitoring because:

* zinc is highly toxic with a 96 hr. LC50 that varies from 0.1 to 1.0 mg/l (11).

* lead is highly toxic with a 96 hr. LC50 of 0.1 to 1.0 mg/l (11).

* chromium and nickel are characteristic of specialty steel and mini-mill process effluents.

Lead and zinc removal from effluent streams will ensure a comparable removal of other metals. Similarly, the removal of benzene which is an indicator for the presence of non-halogenated volatiles, benzo(a)pyrene and naphthalene which are indicators for the presence of base-neutral extractables and phenolics (4AAP) which is an indicator for acid-extractables should result in the comparable control of any other toxic pollutants (4).

Chemicals from the Parameters for Routine Monitoring List have been assigned to specific process subcategories based on pre-regulation monitoring data and on technical knowledge of the individual processes.

Parameters on the Parameters for Routine Monitoring List have been assigned to process subcategories as follows:

Cokemaking	Ammonia Benzene Benzo(a)pyrene Cyanide Naphthalene Oil and Grease Phenolics (4AAP) Suspended Solids
Sintering	Ammonia Cyanide Phenolics (4AAP) Suspended Solids
Ironmaking	Ammonia Cyanide Phenolics (4AAP) Suspended Solids Zinc

Steelmaking (wet process)	Lead Oil and Grease Suspended Solids Zinc
Hot Forming	Lead/Nickel/Chromium* Oil and Grease pH Suspended Solids Zinc
Salt Bath Descaling	Hexavalent Chromium Nickel pH Suspended Solids
Acid Pickling	Chromium Lead Oil and Grease pH Suspended Solids Zinc
Cold Forming	Chromium Lead Oil and Grease pH Suspended Solids Zinc

* For Specialty Steel Mills, the parameter lead will be replaced by nickel and chromium because nickel and chromium are generated during descaling operations.

X CLASSIFICATION OF EFFLUENTS

Iron and steelmaking wastewaters are usually treated individually at the process subcategory effluent level. Final or central treatment is sometimes provided in order to further treat several or all process subcategory effluent streams.

Iron and steel effluent streams are classified as follows:

Cooling water effluent streams
Emergency overflow effluent streams
Final effluent streams
Process subcategory effluent streams
Storage site effluent streams
Storm water effluent streams
Waste Disposal site effluent streams

The Iron and Steel Sector Effluent Monitoring Regulation defines final effluent streams in order to point out that these streams discharge directly to the receiver. Final effluent steams contain process subcategory effluent and one or more of cooling water, storm water and waste disposal site effluent.

XI FLOW MEASUREMENT

Accurate flow measurements are essential for the determination of contaminant loadings to surface watercourses. Flows of process subcategory effluent streams for new flow measurement devices will be measured continuously with an accuracy of plus or minus 5% of the actual flow for the primary measuring devices (ie. sharp crested weirs and orifice plates) and plus or minus 2% of the full scale flow for the secondary devices (ie. stage measuring device, signal processors and integrators). The combined accuracy of the flow measurement systems will be within plus or minus 7% of the actual flow at full scale.

The accuracy of the systems will be 9% of the actual flow at one half of the design flow and 13% of the actual flow at one quarter of the design flow. Therefore, process subcategory effluent flows will be measured within plus or minus 7% and plus or minus 13% of the actual flowrate for the design range of the measuring system.

Existing flow measurement devices should meet the above flow measurement requirements unless flow calibration indicates that these devices are not capable of achieving the required flow measurement accuracy. In these cases an accuracy of plus or minus 15% of the actual flow or better will be required.

Flows of final effluent streams will be continuously measured with an accuracy of plus or minus 20% of the actual flowrate.

In the event that the direct discharger is unable to continuously measure the flow of a final effluent stream and where that stream receives measured flows from all contributing process subcategory effluent streams, the flow of that final effluent stream may be estimated with an accuracy of $\pm$ 20% of the actual flow. The estimate must be made at the time of sampling on three separate occasions over the twenty-four hour sampling period.

Although flow from these final effluent streams will be measured with an accuracy of plus or minus 20% or better, contaminant loadings to the receiver can still be calculated with a high degree of accuracy because the process subcategory effluent streams that contribute to these final effluent streams will be measured with the higher accuracy of plus or minus 7% of the actual flow.

This is consistent with the flow measurement requirements for combined effluent streams as defined in the General Effluent Monitoring Regulation (Ontario Regulation 695/88).

Flows of cooling water, storage site effluent and waste disposal site effluent must be measured or estimated at the time of sampling. The use of water balance calculations and pumping rates to estimate flow measurements is permitted provided that they are capable of accuracies of plus or minus 20% of the actual flow rate. These calculations should be verified by on-site calibration.

The diffuse sources of stormwater flow due to the general flatness of some of the sites and the lack of stormwater collection systems at some of the plant sites have made stormwater flow measurement opportunities limited. The selection of a stormwater effluent sampling point at each plant will facilitate the collection of representative stormwater samples. However, the actual quantity of stormwater that is discharged from the plant may not be reflected by measuring the stormwater flow at that sampling point.

Estimates of the volume of stormwater runoff from a mill site, using information such as the land use, the land type, the runoff coefficient and the amount of rainfall, will ensure that all amounts of stormwater runoff will be accounted for.

The direct discharger will be required to submit the method or methods that will be used to estimate the stormwater runoff from each plant and the accuracy of the stormwater estimates.

Flows of emergency overflow effluents are required to be estimated. There are no requirements for flow measurement accuracy, however, the discharger is required to submit a description of the methods used and the associated accuracy. It is recognized that the location of emergency overflow effluent streams as well as the infrequent nature of these discharges may make the installation of flow measurement devices difficult and unwarranted.

XII FREQUENCY ASSIGNMENT RATIONALE

The monitoring strategy has been designed with the aim of minimizing deviations from the true mean concentrations of the parameters for routine monitoring in order to obtain accurate effluent loadings.

As part of the St. Mary's River MISA Pilot Site Study (6) and the Upper Great Lakes Connecting Channels Study (5), an extensive data base has been established on the quality of the final effluent discharged from Algoma Steel to the St. Mary's River. This data base was used to estimate sample size requirements that minimize the variability in effluent concentrations.

By assuming that the mean value of several parameters is the same as the true mean, Table 4 illustrates the total number of grab samples required at a 95% confidence level for 5, 10, 15, 20 and 25 percent deviations from the data base true means.

It can be seen that a large number of grab samples are required in order to obtain a small deviation from the true mean. For example, one needs 136 samples of phenolics (4AAP) to estimate the mean within a range of 10% of the true population mean at a confidence level of 95% whereas only 22 samples are required for a 25% deviation.

It should be noted that composite samples will produce a deviation which is less than that estimated for the grab samples.

With an accuracy of 7% for flow measurements and an accuracy of 10% for the mean parameter concentrations, loading estimates will be obtained with an accuracy of about 15% (14). It is therefore important to obtain high accuracy for both flow and concentration measurements in order to achieve reliable loading estimates.

A lack of accuracy in loading estimates may lead to the promulgation of effluent limits which may cause unnecessary capital expenditures to the Ontario Iron and Steel Industry.

XIII GENERAL PARAMETER/FREQUENCY ASSIGNMENT RULES

The following general rules have been established and used to develop a cost effective monitoring strategy that will generate meaningful data given the wide variation in plant sizes and processes in the Iron and Steel Industry.

A. The monitoring frequency for a given parameter is a function of the parameter type, the parameter concentration and the effluent stream type.

B. Each process subcategory effluent stream will be monitored for parameters that are characteristic of that process subcategory operation.

C. Each final effluent stream will be monitored for the parameters that are associated with the process subcategory effluent streams that contribute to that final effluent stream.

D. Storm water, storage site, waste disposal site, and emergency overflow effluent stream will be monitored for a common set of parameters to facilitate a comparison of loadings with other effluents.

E. All sites must monitor for pH, suspended solids, specific conductance, dissolved organic carbon, oil and grease, total phosphorus, iron and total metals.

- These parameters reflect the general level of environmental control at the plants and will be useful for plant comparison.
- The total metals reflect the nature of iron and steelmaking operations and the products produced.
- These parameters are surrogates for other parameters or analytical test groups.
- These parameters are used by the Iron and Steel industry to assess the effectiveness of environmental control processes
- The diversity of the sector precludes the application of any one priority organic pollutant as a sector wide parameter.

F. Conventional and priority pollutants that are currently regulated by the United States Environmental Protection Agency for the U.S. Iron and Steel industry will be monitored at a high frequency.

* These pollutants were selected by the U.S EPA on the basis of the analytical data gathered by the Agency, the environmental impact of each pollutant, the ability of the compound to serve as an "indicator" for the presence of other pollutants and the treatability of each compound.

G. Final effluent streams that receive unmonitored process subcategory effluent will be monitored for the parameters on the Parameters for Routine Monitoring List associated with those process subcategory effluents.

H. The analytical test groups that include parameters on the Parameters for Routine Monitoring List which are also organic priority pollutants will be monitored monthly.

I. If a priority pollutant was detected above the Ministry of the Environment Method Detection Limit during the MISA pre-regulation monitoring study then the analytical test group that includes that priority pollutant will be monitored monthly.

J. Parameters that are currently being monitored under IMIS, Certificates of Approval or Control Orders will be monitored at their existing frequencies or higher.

K. Parameters in process and final effluent streams that were detected during the MISA pre-regulation monitoring study at levels that were less than those for the intake waters will be monitored.

L. Plant sites with biological treatment will monitor for total phosphorus.

M. All sites will conduct toxicity testing on final effluent streams and cooling water streams.

A summary of frequency/parameter assignment rules is included in Appendix 1, Table 7.

XIV SPECIFIC PARAMETER/FREQUENCY ASSIGNMENT RULES

There are four basic frequencies of routine monitoring required by the Iron and Steel Sector Effluent Monitoring Regulation - daily, thrice weekly, weekly and monthly. Conventional and priority pollutants were assigned to each monitoring frequency on the following site specific and process specific basis:

Process Subcategory Effluent Thrice Weekly

1. Each process subcategory effluent stream will be monitored thrice weekly for those parameters on the Parameters for Routine Monitoring List associated with that process subcategory.

    * Thrice weekly monitoring will provide a set of 12 data points for calculating monthly averages for both conventional and priority pollutants.

2. Each process subcategory effluent stream with biological treatment will be monitored thrice weekly for Total Phosphorus (analytical test group 6).

    * Total Phosphorus is an indicator of plant performance.
    * Thrice weekly monitoring will help determine phosphorus utilization in biological treatment and will provide data for evaluating plant effectiveness.

Process Subcategory Effluent Monthly

3. Each process subcategory effluent stream will be monitored monthly for the analytical test groups that include organic priority pollutant parameters on the Parameters for Routine Monitoring List.

    * To show whether parameters on the Parameters for Routine Monitoring List which are monitored three times weekly are indicative of the presence of contaminants in corresponding analytical test groups.

    * To provide data in support of future limits development.

Final Effluent Daily

4. Each final effluent stream will be monitored daily for a common set of parameters that includes pH, specific conductance, suspended solids and oil and grease.

    * Daily monitoring is required to assess parameters with high variabilities.
    * This common set of parameters will reflect the general level of environmental control at the plant and will be useful for inter-plant comparisons.
    * Daily monitoring will provide insight into plant upset and spill conditions.
    * Data will be used to set limits.

Final Effluent Thrice Weekly

5. Each final effluent stream, with the exception of those final effluent streams that receive monitored process subcategory effluents, will be monitored thrice weekly for the parameters on the Parameters for Routine Monitoring List associated with the process subcategory effluent streams that contribute to that final effluent stream.

6. Each final effluent stream that is likely to contain soluble organics will be monitored thrice weekly for Dissolved Organic Carbon (analytical test group 5a).

    * Dissolved Organic Carbon is more likely to reflect trace organics than TOC, BOD_5, or COD.
    * Thrice weekly monitoring for Dissolved Organic Carbon will provide data to assess trace organics that may be associated with plant performance.

Final Effluent Weekly

7. Each final effluent stream that is not likely to contain soluble organics will be monitored weekly for Dissolved Organic Carbon (analytical test group 5a).

    * Weekly monitoring for Dissolved Organic Carbon was adopted for selected final effluent streams as a conservative approach to ensure that any trace organics will be detected.

8. Each final effluent stream will be monitored weekly for Total Phosphorus (analytical test group 6).

    * Weekly monitoring for Total Phosphorus is required to provide data for the International Joint Commission (IJC).

Final Effluent Monthly

10. Each final effluent stream will be monitored monthly for the analytical test groups that contain priority pollutants above MOE analytical method detection limits and that are associated with the process subcategory effluent streams that contribute to that final effluent stream.

    * To show whether the presence of one member of an analytical test group is indicative of the presence of contaminants in corresponding analytical test groups.
    * To highlight compounds that may be parameters for inclusion on the Parameters for Routine Monitoring List and to estimate their annual loadings.
    * To collect data for effluent limits development.

Final Effluent Semi-annually

11. Each final effluent stream will be monitored twice per year for Chlorinated Dibenzo-p-dioxins and Dibenzofurans (analytical test group 24) and Polychlorinated Biphenyls (analytical test group 27) although they are not generated by iron and steelmaking processes.

    * To complement the existing Ministry of the Environment database which consists of fifteen tests for chlorinated dibenzo-p-dioxins and dibenzofurans and sixty-seven tests for PCB's.
    * To provide data for effluent limits development.

XV MONITORING DATA APPLICATIONS

A) Process Subcategory Effluent Streams

This section deals with the allocation of the parameters on the Parameters for Routine Monitoring List to process subcategory effluent streams and the assignment of the parameters to specific monitoring frequencies.

* **Ammonia**

  Ammonia is usually found at high levels in wastewaters from by-product recovery coking operations and ironmaking/sintering operations prior to wastewater treatment.

  High ammonia levels in combination with cyanide and zinc are toxic to aquatic life and exert a high oxygen demand on receiving waters.

  Cokemaking, sintering and ironmaking process subcategory effluent streams will be monitored thrice weekly for ammonia.

* **Benzene**

  Benzene is usually found in cokemaking wastewaters and is generally recovered in the coke by-product recovery plant. Benzene is an indicator of the presence of non-halogenated volatiles.

  Benzene has demonstrated teratogenic effects in laboratory animals and mutagenic effects in humans and other animals.

  Cokemaking process subcategory effluent streams will be monitored thrice weekly for benzene and monthly for non-halogenated volatiles (analytical test group 17).

* **Cyanide**

  Cyanide is usually found in wastewaters from by-product recovery coking operations, sintering operations and ironmaking operations.

  Cyanide ions can combine with ammonia and zinc to form compounds which are toxic to aquatic life. The synergistic effects of cyanide with other metals result in the formation of more toxic complexes than with cyanide itself.

Cokemaking, sintering and ironmaking process subcategory effluent streams will be monitored thrice weekly for cyanide (analytical test group 2).

* **Oil and Grease**

Oil and grease are considered to be one pollutant parameter. Oil and grease compounds include lubricants, cutting fluids and light hydrocarbons.

Lubricants and cutting fluids are generally either nonemulsifiable oils such as lubricating oils and greases or emulsifiable oils such as soluble oils, rolling oils, and cutting oils. Emulsifiable oils may contain fat, soap and various other additives.

Light hydrocarbons include light fuels such as gasoline, kerosene, and miscellaneous solvents used for industrial processing, degreasing or cleaning purposes.

Oil and grease is usually found in wastewaters from cokemaking, continuous casting, hot forming and acid pickling operations.

Oil and grease even in small quantities causes troublesome taste and odour problems. Fish are adversely affected by oils as oil emulsions may adhere to their gills causing suffocation.

Cokemaking, steelmaking, hot forming, acid pickling and cold forming process subcategory effluent streams will be monitored thrice weekly for oil and grease. In addition, all final effluent streams will be monitored daily for oil and grease.

The presence of oil and grease may reflect incidents of plant spills or upsets.

* **pH**

pH is an indicator of operating efficiency. Hot forming, salt bath descaling, acid pickling and cold forming effluent streams will be monitored thrice weekly for pH. Effluents from these process subcategories have variable pH values whereas effluents from other process subcategory operations have constant pH values.

In addition, all final effluent streams will be monitored daily for pH.

* **Phenolics (4AAP)**

Phenolics (4AAP) are found in cokemaking, sintering and ironmaking process subcategory effluent streams. Phenolic analysis, using the 4-aminoantipyrene method (4AAP), is a useful indicator of the presence of acid extractable toxic organic pollutants.

High total phenolic concentrations may cause toxic effects to aquatic life and may also cause taste and odour problems in water supplies. Cokemaking, sintering and ironmaking process subcategory effluent streams will be monitored thrice weekly for phenolics (4AAP).

* **Polynuclear Aromatic Hydrocarbons (PAH's)**

PAH's are formed as a result of incomplete combustion when organic compounds are burned with insufficient oxygen. PAH compounds are found frequently in cokemaking process subcategory effluent streams.

Some polynuclear aromatic hydrocarbon compounds, detected in cokemaking process subcategory effluent streams, are carcinogenic (15).

Cokemaking process subcategory effluent streams will be monitored thrice weekly for naphthalene and benzo(a)pyrene. Cokemaking process subcategory effluent streams will also be monitored monthly for base neutral extractables (analytical test group 19).

* **Suspended Solids**

There are substantial quantities of particulates generated in the steelmaking process and contained in the process off-gases. As water is used to condition and clean these gases in the wet steelmaking process, the particulates are transferred to the process waters.

Suspended solids concentrations provide an indication of the degree to which the process wastewaters are contaminated and also an indication as to the degree of the wastewater treatment that is being achieved. The removal of suspended solids from the effluent stream will result in the removal of certain toxic metals which are entrained in the suspended solids.

When suspended solids settle to form sludge deposits on a stream or lake bed they often damage aquatic life by destroying the benthic organisms that would otherwise occupy the habitat.

All process subcategory effluent streams will be monitored thrice weekly for suspended solids. All final effluent streams will be monitored daily for suspended solids.

* **Total Metals**

Total metals (analytical test group 9) will be monitored monthly at all final effluents.

* **Chromium**

Chromium and chromium compounds are used in the production of steel alloys and may also be used to inhibit corrosion. Chromium and chromium compounds are usually found in wastewaters from specialty steel hot forming operations, acid pickling operations and cold forming operations. The toxicity of chromium salt to aquatic life depends on pH, hardness, water temperature and the valence of the chromium.

Specialty steel hot forming process subcategory effluent streams, acid pickling process subcategory effluent streams and cold forming process subcategory effluent streams will be monitored thrice weekly for chromium.

* **Hexavalent Chromium**

Hexavalent Chromium is a carcinogen and can retard fish growth. Hexavalent chromium is usually found in wastewaters from salt bath descaling operations.

Salt bath descaling process subcategory effluent streams will be monitored thrice weekly for hexavalent chromium.

* **Lead**

Lead is usually found in wastewaters from steelmaking, hot forming, acid pickling and cold forming operations. Lead is toxic to aquatic life and is a carcinogen to some animal species.

Steelmaking, hot forming, acid pickling and cold forming process subcategory effluent streams will be monitored thrice weekly for lead.

* **Nickel**

Nickel is usually found in hot forming wastewaters from specialty steel mills. Nickel salts can kill fish at very low concentrations.

Specialty steel hot forming process subcategory effluent streams will be monitored thrice weekly for nickel.

* **Zinc**

Zinc is used as a protective coating on steel. It is applied by hot dipping (ie. dipping the steel in molten zinc) or by electroplating.

Zinc compounds can cause lethal effects to aquatic life. The additive or synergistic effects of zinc, ammonia and cyanide can result in toxic conditions which are greater than those of the original contaminant.

Zinc is usually found in wastewaters from ironmaking, steelmaking (wet), hot forming, acid pickling and cold forming operations.

Effluent streams associated with these process subcategories will be monitored thrice weekly for zinc.

B) Final Effluent Streams

Each final effluent stream will be monitored monthly for the analytical test groups that contain priority pollutants above MOE analytical method detection limits and that are associated with the process subcategory effluent streams that contribute to that final effluent stream. Additional parameters to be monitored in final effluent streams are: dissolved organic carbon, iron and total phosphorus.

* **Dissolved Organic Carbon**

Dissolved Organic Carbon (DOC) is a measure of the soluble organic loading to the receiving water.

DOC can be detected at a lower detection limit (0.5 mg/l) than Total Organic Carbon (5 mg/l) and Chemical Oxygen Demand (10 mg/l). Monitoring of DOC will facilitate a comparison of loadings among all industrial sectors.

All final effluents will be monitored thrice weekly for Dissolved Organic Carbon.

* **Iron**

  Iron is the basic element in the production of steel. Iron is currently monitored at all MISA iron and steel mills under IMIS. Final effluent streams will be monitored weekly for iron. A higher monitoring frequency was not considered for iron because, as previously mentioned, it is not an indicator compound.

* **Total Phosphorus**

  Phosphorus is added to biological treatment systems as a nutrient which aids in biological activity. Total phosphorus is currently monitored under IMIS at some of the mills in order to provide reporting data for the International Joint Commission.

  All final effluent streams will be monitored weekly for total phosphorus.

C) Monitoring Schedules

Monitoring Schedules which show the application of the monitoring strategy to each mill are included in Appendix II. These schedules identify process subcategory effluent, final effluent, cooling water, storm water effluent, waste disposal site effluent, storage site effluent and emergency overflow effluent streams for each mill.

These schedules also outline monitoring requirements and toxicity requirements for each stream.

D) Monitoring Data Use

Daily monitoring data will be used to:

* Calculate average daily concentrations and loadings.
* Identify average and maximum effluent limits for any one day.
* Establish a comparison among different sites.
* Identify upset and spill conditions both in magnitude and frequency.
* Establish limits to control conventional pollutants.

Thrice weekly monitoring data will be used to :

* Calculate monthly loadings and concentrations.
* Provide a record of variability in process loadings and treatment plant upsets and spills.

* Aid in the identification of well operated wastewater treatment plants which consistently control toxic contaminants and which could be considered as benchmarks for the designation of BATEA.
* Establish the performance of wastewater treatment plants in comparison to EPA reference limits.
* Establish limits for priority pollutants and conventional compounds in effluent streams.
* Establish a basis for inter-sector comparisons of loadings to the receiving water.

Weekly monitoring data will be used to :

* Evaluate the need for control of traditional contaminants such as iron and total phosphorus.
* Establish limits to control conventional and priority pollutants.

Monthly monitoring data will be used to :

* Show whether particular toxic contaminants that are monitored more frequently are representative of corresponding groups of toxic contaminants.
* Identify contaminants of concern which may require more frequent monitoring.
* Provide information on the presence of toxic contaminants to be considered with the monthly toxicity testing results.
* Establish limits to control priority pollutants.

XVI COOLING WATER

Cooling water is non-contact water and should not contain contaminants associated with process subcategory effluent streams. However, in order to ensure that cooling waters are not contaminated, they will be monitored monthly for parameters that are representative of iron and steelmaking processes.

Cooling waters for integrated iron and steel mills will be monitored monthly for the following parameters:

Ammonia	Chromium
Cyanide	Dissolved Organic Carbon
Iron	Lead
Oil and Grease	pH
Phenolics (4AAP)	Suspended Solids
Total Phosphorus	Zinc

Some of these parameters are on the Parameters for Routine Monitoring List. The presence of organic priority pollutants in cooling water streams will be monitored during cooling water characterization.

Cooling waters for specialty steel and mini-mills will be monitored monthly for the following parameters:

Chromium	Dissolved Organic Carbon
Iron	Lead/Nickel
Oil and Grease	pH
Suspended Solids	Total Phosphorus
Zinc	

Ammonia, cyanide and phenolics (4AAP) are not included in specialty steel and mini-mill cooling water monitoring requirements because there are no cokemaking, sintering or ironmaking operations at these sites.

XVII STORM WATER

Storm water monitoring is necessary to assess the significance of storm water discharges as sources of contaminant loading.

Storm waters from integrated iron and steel mills will be monitored monthly for the following parameters:

Ammonia	Benzene
Benzo(a)pyrene	Chromium
Cyanide	Iron
Lead	Naphthalene
Oil and Grease	pH
Phenolics (4AAP)	Suspended Solids
Zinc	

Storm waters from specialty steel and mini-mills will be monitored monthly for the following parameters:

Iron	Lead/Nickel
Oil and Grease	pH
Suspended Solids	Zinc

Ammonia, benzene, benzo(a)pyrene, cyanide, naphthalene and phenolics (4AAP) are not included in specialty steel and mini-mill storm water monitoring requirements because there are no cokemaking, sintering or ironmaking operations at these sites.

XVIII STORAGE SITE EFFLUENT, WASTE DISPOSAL SITE EFFLUENT AND EMERGENCY OVERFLOW EFFLUENT

As with stormwater monitoring, the monitoring of storage site effluents, waste disposal site effluents and emergency overflow effluents will help assess their significance as sources of contaminant loading.

This assessment will be facilitated by monitoring for the parameters on the Parameters for Routine Monitoring List that have been assigned to process subcategory effluent streams and final effluent streams. The monitoring of these parameters will permit a direct comparison of loadings with other effluents.

Storage site effluents and waste disposal site effluents will be monitored at the time of discharge with the provision that the collection frequency shall not exceed twice per month or twelve times per year.

Emergency overflow effluents will be monitored on an event basis.

Integrated iron and steel mills will monitor storage site effluent streams, waste disposal site effluent streams and emergency overflow effluent streams for some of the following parameters:

- Ammonia
- Benzene
- Benzo(a)pyrene
- Chromium
- Cyanide
- Iron
- Lead
- Naphthalene
- Oil and Grease
- pH
- Phenolics (4AAP)
- Suspended Solids
- Zinc

Specialty steel and mini-mills will monitor waste disposal site effluent streams and emergency overflow effluent streams for:

- Iron
- Oil and Grease
- Suspended Solids
- Lead/Nickel
- pH
- Zinc

Additional parameters will be included in accordance with Certificate of Approval and Control Order requirements.

XIX CHARACTERIZATION AND OPEN CHARACTERIZATION

Characterization of iron and steel mill effluents, using consistent and uniform sampling and analytical protocols, is required in order to determine the presence or absence of priority pollutants.

As the analytical methods for the characterization are expensive and with the prior knowledge that most pollutants are likely to be at low concentrations, the criterion used to estimate the frequency of characterization is based on the statistical presence/absence of a contaminant.

Characterizations must be able to detect compounds that may be present infrequently but may have the potential of adversely affecting the environment. For a given parameter that is present 10% of the time, the characterization should be able to detect that parameter with a probability of 50% or better. With ten characterizations the probability of detecting a pollutant that is present in an effluent stream 10% of the time is 65% at a confidence level of 95% (Table 5).

For the purpose of characterization, analytical test groups from the Iron and Steel Sector List have been assigned to integrated iron and steel mills and to specialty steel and mini-mills.

The analytical test groups that form the Characterization Parameters Schedule for the Integrated Iron and Steel Mills are:

Group 2	Cyanide;
Group 3	Hydrogen Ion (pH);
Group 4a	Nitrogen (Ammonia plus Ammonium and Total Kjeldahl Nitrogen);
Group 4b	Nitrogen (Nitrate + Nitrite);
Group 5a	Organic Carbon (Dissolved Organic Carbon);
Group 5b	Organic Carbon (Total Organic Carbon);
Group 6	Total Phosphorus;
Group 7	Specific Conductance;
Group 8	Suspended Solids;
Group 9	Total Metals;
Group 10	Hydrides;
Group 11	Chromium Hexavalent;
Group 12	Mercury;
Group 14	Phenolics (4AAP);
Group 15	Sulphide;
Group 16	Volatiles, Halogenated;
Group 17	Volatiles, Non-Halogenated;
Group 19	Base Neutral Extractables;
Group 20	Acid Extractables;
Group 23	Extractables, Chlorinated;
Group 24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans;

Group 25	Solvent Extractables;
Group 26	Fatty and Resin Acids;
Group 27	PCBs (Total).

The analytical test groups that form the Characterization Parameters Schedule for the Specialty Steel and Mini-Mills are:

Group 3	Hydrogen Ion (pH);
Group 4a	Nitrogen (Ammonia plus Ammonium and Total Kjeldahl Nitrogen);
Group 4b	Nitrogen (Nitrate + Nitrite);
Group 5a	Organic Carbon (Dissolved Organic Carbon);
Group 5b	Organic Carbon (Total Organic Carbon);
Group 6	Total Phosphorus;
Group 7	Specific Conductance;
Group 8	Suspended Solids;
Group 9	Total Metals;
Group 10	Hydrides;
Group 11	Chromium Hexavalent;
Group 16	Volatiles, Halogenated;
Group 17	Volatiles, Non-Halogenated;
Group 19	Base Neutral Extractables;
Group 20	Acid Extractables;
Group 23	Extractables, Chlorinated;
Group 24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans;
Group 25	Solvent Extractables;
Group 27	PCBs (Total).

Cyanide (Group 2), Mercury (Group 12), Phenolics (4AAP) (Group 14), and Sulphide (Group 15) are not included on the Specialty Steel and Mini-Mill Characterization Parameters Schedule because they are not produced by nor introduced to specialty steel and mini-mill processes and unit operations.

Fatty and Resin Acids (Group 26) have also been excluded from the Specialty Steel and Mini-Mill Characterization Parameters Schedule because fatty acids are applied only to cold forming operations. There are no cold forming operations at specialty steel mills and mini-mills in Ontario.

When a wastewater sample is analyzed by Gas Chromatography/Mass Spectrometry (GC/MS) it is not uncommon to detect numerous compounds. When samples are routinely analyzed for priority pollutants, an analyst will search for a target list of compounds and confirm the presence or absence of these substances. To accomplish this, the GC/MS instrument is programmed to identify target compounds and by analyzing standards containing known concentrations of these compounds, quantification is also accomplished.

Effluent samples are usually analyzed for:

1. A specific target list of compounds on a quantitative basis using specified analytical method detection limits.
2. Other compounds that may be present on a qualitative basis with a detection limit of 1 to 10 ppb.

It is therefore possible to make a definite statement concerning the type of compounds that are and are not detected and to provide quantitative information for a predetermined list of compounds.

Four characterizations, where target compounds will be analyzed (except for analytical test groups 24 and 27) and four open characterizations, where target and non-target compounds will be analyzed, will be conducted on each final effluent.

Final effluent characterization and open characterization analyses will be conducted during different months in order to gain insight into different plant operating conditions and the seasonal variability of plant treatment processes.

The analytical method detection limits for the open characterizations will conform with those listed in the General Effluent Monitoring Regulation (Ontario Regulation 695/88) for the target compounds in the analytical test groups 16, 17, 19, 20 and 23.

In order to quantify target compounds at the analytical method detection limits specified in the General Effluent Monitoring Regulation, the following conditions must be met:

* no chemical clean-up should be used;
* standards must be available for the target compounds;
* recoveries and response factors for the target compounds must be obtained by spiking organic free water;
* target compounds must be quantified relative to the same internal standards used in the sector list characterizations. These concentrations are quantitative. Quantitations are based on a one-to-one compound calibration;
* Non-target compounds are quantitated relative to the same internal standards used in the open characterization. These concentrations are semi-quantitative;

By quantifying compounds at the analytical method detection limits outlined in the General Effluent Monitoring Regulation a total of eight characterizations will be conducted on each final effluent for the analytical test groups 16, 17, 19, 20 and 23 during the one year monitoring period.

Parameters from analytical test groups 16, 17, 19, 20 and 23 are commonly found in integrated iron and steelmaking wastewaters. Parameters from analytical test groups 17 and 20 are not found in wastewaters from specialty steel and mini-mill operations, however, they were included in the characterization requirements as they are reported as part of the characterization analyses for analytical test groups 16 and 19.

The eight characterizations for analytical test groups 16, 17, 19, 20 and 23, together with two Ministry of the Environment characterizations that will be conducted during the regulation period, will ensure that a total of 10 characterizations will be conducted on each final effluent stream for these test groups.

Characterization of cooling water for parameters on the Characterization Parameters Schedules will be conducted quarterly (except for analytical test groups 24 and 27) in order to identify any contaminants that may be present in cooling water effluent streams due to cross-contamination with process subcategory effluent streams. Quarterly characterization will provide a probability of 94% for detecting compounds 50% of the time at a 95% confidence level.

DIOXINS AND PCB'S

Analytical test group 24 (Chlorinated dibenzo-p-dioxins and dibenzofurans) will only be monitored semi-annually because of the high analysis cost and the low probability of detecting group members in iron and steel mill effluents.

Fifteen characterization tests for dibenzo-p-dioxins and dibenzofurans were conducted by the Iron and Steel Sector and the Ministry of the Environment during the pre-regulation study. These tests indicated that dioxins and dibenzofurans are not present in iron and steel wastewaters.

Polychlorinated biphenyls (analytical test group 27) are not generated by iron and steelmaking processes and are unlikely to be present in wastewaters from these operations.

Polychlorinated biphenyls were not detected above the Ministry of the Environment Analytical Method Detection Limit in the sixty-seven PCB characterizations that were conducted during the pre-regulation monitoring study. Analytical test group 27 will also be monitored semi-annually.

XX TOXICITY TESTING

In moving towards the reduction of contaminant loadings to the environment, efforts will be made to prohibit discharges of persistent toxic pollutants. With the sole use of chemical monitoring data it is difficult to assess effluent toxicity with adequate precision. Toxicity testing has the advantage that it considers the interaction that may occur between the various components of an effluent stream.

Final effluent and cooling water will be tested using the 96 hour LC50 Rainbow Trout Toxicity Test and the 48 hour LC50 Daphnia magna Acute Lethality Toxicity Test. Ministry of the Environment protocols for these two toxicity tests must be used and are available from the Ministry (16,17).

Table 6 illustrates that with either twelve fish toxicity tests or twelve Daphnia magna toxicity tests, the probability of detecting a toxic effluent is 0.9998. Therefore, the Daphnia magna test and the fish toxicity test will each be carried out monthly on final effluent streams.

The frequency of fish toxicity can be calculated using statistical analysis. Given an effluent that is marginally toxic and which will kill exactly 50% of the fish, the probability of identifying this effluent as toxic in 3 tests is 0.8750 (P50KILL for N = 3 see Table 6). The probability of failing to identify it as toxic is 1 - 0.8750 = 0.125.

Since probability values range from 0 to 1.0, a value of 0.875 is acceptable in order to correctly identify a toxic effluent from 3 tests. Therefore, in the event that three consecutive tests prove to be non-lethal, it is justifiable to conduct monthly toxicity tests on undiluted effluents for pass/fail purposes only.

If more than two fish die during a pass/fail test then toxicity tests using full series dilution will be conducted monthly until the effluent proves to be non-toxic for three consecutive months.

Since the probability of cooling water being non-toxic is high, Rainbow Tout and Daphnia magna toxicity tests for cooling water will be carried out on a quarterly basis. All tests will be carried out using full series dilution.

XXI QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance and quality control (QA/QC) encompass all of the procedures undertaken to ensure that the data produced are generated within known probability limits of accuracy and precision.

Quality assurance is the overall verification program which provides producers and users of data the assurance that predefined standards of quality at predetermined levels of confidence are met. Quality assurance is comprised of two elements: quality control and quality assessment.

Quality control is the overall system of guidelines, procedures and practices which are designed to regulate and control the quality of products or services with regards to previously established performance criteria and standards.

Quality assessment is the overall system of activities which ensure that quality control is being performed effectively. This is carried out immediately following quality control and involves evaluating and auditing quality control data to ensure the success of the quality control program.

QA/QC is one of the most important aspects of the MISA Effluent Monitoring Regulations. The QA/QC program includes many small but essential activities ranging from proving the cleanliness of sample bottles, using proper sampling equipment, containers and preservatives to instrument calibration; validation of authenticity of standards, inclusion of blanks, spikes and controls in analytical runs to documenting performance; participation in external round-robins to defining the proper method for reporting a final data number. Omission of one of these activities can lead to unreliable data resulting in improper conclusions and perhaps inappropriate actions being taken.

The financial stakes riding on the effluent monitoring regulation data are too high to compromise the generated data with inadequate QA/QC.

Quality control monitoring provides information about the quality of the effluent samples collected and whether contamination, either during sampling or transportation, has occurred. Quality control samples for the Iron and Steel Effluent Monitoring Regulation will be collected at one process subcategory effluent stream, one final effluent stream and one cooling water stream per plant site.

Emphasis was placed on quality control for cokemaking process subcategory effluent streams and final effluent streams that receive cokemaking process subcategory effluents. Cokemaking unit operations produce complex effluents which contain a variety of organic and inorganic pollutants. In addition, cokemaking operations are the major source of organic pollutants that are generated during the iron and steelmaking making process.

Quality control monitoring for cooling water will provide a reference against which a comparison can be made in the event that monitoring of the cooling water effluent stream shows that cross-contamination has occurred with process subcategory effluent streams.

XXII ECONOMIC IMPLICATIONS OF THE REGULATION

The monitoring and abatement requirements under the MISA program will require both operating and capital expenditures. The Policy and Planning Branch of the Ministry has produced two reports which assess the economic environment of the iron and steel sector and analyze the financial implications of the incremental costs of monitoring imposed by the MISA monitoring requirements.

The first report entitled "Iron and Steel Sector Profile" (18) contains an economic assessment and analysis of the iron and steel sector based on published information on domestic and international iron and steel operations and company data on the plants that are classified as direct dischargers. This sector profile included plants which were identified as direct dischargers as of October, 1986 and thus does not include company specific data on Lake Ontario Steel Company (LASCO) and Ivaco Rolling Mills.

The report concludes that the Ontario iron and steel mills which are of concern to the MISA program face different market prospects based on the nature of their products, the outlook for the end-user markets and their cost structures. The overall prospects for domestic steel consumption in Canada suggest that growth will be modest and that much of the demand may be filled by imports.

The second report entitled "Economic Implications of the MISA Monitoring Regulation on Ontario's Iron and Steel Sector" (19) presents estimates and implications of the incremental costs to the Iron and Steel Sector of the Effluent Monitoring Regulation requirements. These estimates were developed with the participation of industry representatives.

The iron and steel industry in Canada and Ontario is highly influenced by fluctuations in business cycles and so its outlook is dependent on the general economic conditions in the economy.

Incremental capital costs for the iron and steel plants which are direct dischargers subject to MISA monitoring requirements are estimated to be $5.1 million, and range from $3.0 to $7.1 million using an uncertainty factor of +/- 40%.

- Flow measurement devices account for 65% of the total capital costs, sampling equipment accounts for 35% and reporting requirements account for less than 1% of the total capital costs.

Operating costs over the 12-month period of the regulation are estimated at $3.3 million using commercial laboratory prices for analytical testing.

- Estimates for analytical testing represent 63% of total operating costs, while sampling requirements amount to 24%, reporting and administration 7% and flow measurement estimates account for the remaining 6%.

The total point estimate of the incremental cost of the MISA monitoring requirements including both capital and operating expenses for the Iron and Steel Sector amounts to $8.4 million, ranging from $6.3 to $10.4 million.

- The two firms that own 4 integrated iron and steel mills are expected to bear 92% of the total estimated costs.

Estimates of the incremental costs by plant are presented in Appendix I, Table 8.

Analysis of these cost estimates indicates that if all the Iron and Steel Sector plants had to monitor for a common list of contaminants at the same frequency the cost of routine monitoring would total $4.6 million as opposed to $1.8 million under the proposed Monitoring Regulation. This represents a cost saving of $2.8 million and is a measure of the cost-effectiveness of the process-specific approach proposed for the Iron and Steel Sector.

As shown in Appendix I, Table 9, the economic impacts of the estimated monitoring costs on the Iron and Steel Sector are small in relation to aggregate sectoral financial indicators. For example, the incremental operating costs of monitoring amount to between 0.1% and 4% of the annual average after-tax profits earned by these companies between 1981 and 1987. When earnings were at their lowest, operating costs of monitoring would have represented between 0.3% and 22% of the companies' annual after-tax earnings (losses).

Incremental capital costs of monitoring represent between 0.01% to 1% of the companies' annual average capital expenditures for the period 1981-1987. For the year in which the companies' capital expenditures were at their lowest for the period, capital costs associated with monitoring represent between .01% and 5.5% of capital expenditures.

Potential benefits to the firms of the monitoring regulation include gains in productivity by improving processes, reduction in water usage in manufacturing processes and in raw material losses in wastewater, and goodwill gained by demonstrating to the public that the firm is responding to environmental problems.

The monitoring regulation may have a small, but positive temporary impact on employment in the steel industry because extra staff may be needed to take samples, maintain equipment and report data. The monitoring requirements will stimulate demand for laboratory services and flow measurement and sampling equipment. The monitoring database will be available to design cost-effective control programs aimed at virtual elimination of toxic contamination where it occurs.

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APPENDIX I

TABLE 1: IRON AND STEEL PRE-REGULATION MONITORING EFFLUENT CHARACTERIZATIONS

SITE	STREAM	# OF CHARACTERIZATIONS		DIOXINS	
		INDUSTRY	MOE	INDUSTRY	MOE
Atlas	Intake	1	-	1	-
	Final Effluent	3	1	1	-
LASCO	Intake	1	-	-	-
	Final Effluent	2	1	1	1
Dofasco	Intake	1	-		
	Coke Making Influent	3	3	1	
	Coke Making Effluent	3	2	1	
	Steel Making Influent	1	-		
	Steel Making Effluent	3	-	1	-
	Hot Forming Influent	1	-		
	Hot Forming Effluent	3	-	1	-
	Cold Forming Influent	1	-		
	Cold Forming Effluent	1	-		
Stelco Hilton	Intake	3	-	1	-
	Iron Making	3	3	1	1
	Oil Treatment Plant Effluent	3	-	1	-
	Hot Forming Influent	2	-		
	Hot Forming Effluent	2	-		
	Final Effluent	3	1	1	-
	Cooling Water	2	-		
	Weak Ammonia Liquor (coke by-product effluent)	2	-		
Stelco Lake (Erie Works)	Intake	1	-		
	Final Effluent	2	-	1	-
	Process Effluent	2	-	1	-
	East Storage Lagoon	1	-		
Algoma Steel*	Coke Making	1	-		
	Cold Mill	1	-		
	Cooling Water	3	-		
	Final Effluent	2	-		
	Hot Forming	1	-		

* Algoma Steel was monitoring during UGLCC Study and MISA Pilot Site Study.

TABLE 2: IRON AND STEEL PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED	COKE MAKING	IRON MAKING	STEEL MAKING WET	HOT FORMING	COLD FORMING	LASCO	ATLAS	ALGOMA FINAL EFFLUENT	STELCO HILTON WORKS	STELCO LEW PROCESS	STELCO LEW FINAL
9	Total metals	Aluminum	4/6	6/6	3/3	9/9	6/7	2/3	4/4	2/2	7/7	2/2	2/2
		Beryllium	0/6	1/6	0/3	0/9	0/7	0/3	ND/4	0/2	0/7	0/2	0/2
		Cadmium	3/6	2/6	1/3	3/9	3/7	1/3	ND/4	5/14	4/7	0/2	0/2
		Chromium	6/6	4/6	3/3	6/9	5/7	2/3	4/4	9/14	7/7	2/2	1/2
		Cobalt	1/6	1/6	0/3	1/9	3/7	0/3	0/4	0/14	1/7	0/2	0/2
		Copper	4/6	4/6	2/3	9/9	7/7	3/3	4/4	14/14	7/7	2/2	2/2
		Lead	1/6	6/6	3/3	9/9	6/7	2/3	4/4	14/14	7/7	2/2	2/2
		Molybdenum	3/6	3/6	3/3	5/9	5/7	2/3	4/4	2/2	6/7	2/2	2/2
		Nickel	5/6	4/6	3/3	9/9	5/7	3/3	4/4	5/14	7/7	2/2	2/2
		Silver	0/6	2/6	2/3	0/9	0/7	1/3	0/4	0/2	2/7	1/2	0/2
		Thallium	0/6	3/6	0/3	0/9	0/7	1/3	0/4	1/2	0/7	0/2	0/2
		Vanadium	5/5	1/6	1/3	0/9	0/7	0/3	0/4	0/2	2/7	0/2	0/2
		Zinc	5/6	6/6	3/3	6/9	5/7	2/3	4/4	14/14	7/7	2/2	2/2
10	Hydrides	Antimony	4/6	6/6	3/3	5/9	3/7	2/3	4/4	2/2	7/7	2/2	2/2
		Arsenic	6/6	6/6	3/3	9/9	7/7	2/3	4/4	13/14	7/7	2/2	2/2
		Selenium	6/6	4/6	3/3	5/9	1/7	1/3	2/4	2/2	6/7	1/2	2/2
11	Chromium (Hexavalent)	Chromium (Hexavalent)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12	Mercury	Mercury	6/6	0/6	0/3	0/9	1/7	0/3	0/4	10/14	2/7	0/1	0/1
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		1,1,2-Trichloroethane	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		1,1-Dichloroethane	0/6	0/6	0/3	0/9	2/7	0/3	0/4	1/14	0/7	0/2	0/2
		1,1-Dichloroethylene	0/6	0/6	0/3	0/9	2/7	0/3	0/4	0/2	0/7	0/2	0/2
		1,2-Dichlorobenzene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		1,2-Dichloroethane (Ethylene dichloride)	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	0/2	0/2
		1,2-Dichloropropane	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		1,3-Dichlorobenzene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		1,4-Dichlorobenzene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		Bromoform	0/6	1/6	0/3	1/9	0/7	0/3	0/4	0/2	0/7	2/2	2/2
		Bromomethane	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	1/2	0/2
		Carbon tetrachloride	1/6	1/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		Chlorobenzene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	0/2	0/2
		Chloroform	1/6	2/6	0/3	3/9	4/7	0/3	0/4	1/14	1/7	2/2	2/2
		Chloromethane	0/6	1/6	1/3	0/9	0/7	0/3	0/4	0/14	0/7	0/2	0/2

TABLE 2: IRON AND STEEL PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED	COKE MAKING	IRON MAKING	STEEL MAKING WET	HOT FORMING	COLD FORMING	LASCO	ATLAS	ALGOMA FINAL EFFLUENT	STELCO HILTON WORKS	STELCO LEW PROCESS	STELCO LEW FINAL
16	Volatiles, Halogenated (continued)	Cis-1,3-Dichloropropylene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	0/2	0/2
		Dibromochloromethane	0/6	0/6	0/3	1/9	0/7	0/3	0/4	0/14	0/7	2/2	2/2
		Ethylene dibromide	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	2/2	2/2
		Methylene chloride	0/6	1/6	1/3	1/9	1/7	0/3	1/4	0/14	0/7	1/2	0/2
		Tetrachloroethylene (Perchloroethylene)	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		Trans-1,2-Dichloroethylene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		Trans-1,3-Dichloropropylene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		Trichloroethylene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		Trichlorofluoromethane	0/6	0/6	0/3	0/9	0/7	0/3	2/4	0/2	0/7	0/2	0/2
		Vinyl chloride (Chloroethylene)	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
17	Volatiles, Non-Halogenated	Benzene	2/6	0/6	0/3	0/9	1/7	0/3	0/4	3/14	0/7	1/2	1/2
		Styrene	2/6	1/6	0/3	0/9	0/7	0/3	0/4	4/14	0/7	0/2	1/2
		Toluene	2/6	1/6	0/3	0/9	1/7	0/3	0/4	3/14	0/7	0/2	2/2
		o-Xylene	4/6	0/6	0/3	0/9	0/7	0/3	0/4	5/14	0/7	0/2	0/2
		m-Xylene and p-Xylene	5/6	0/6	0/3	0/9	0/7	0/3	0/4	6/14	0/7	0/2	0/2
18	Volatiles, Water Soluble	Acrolein	0/6	0/3	0/3	0/9	0/9	0/2	0/4	0/2	0/6	0/2	0/2
		Acrylonitrile	0/6	0/3	0/3	0/9	0/9	0/2	0/4	0/2	0/6	0/2	0/2
19	Extractables, Base Neutral	Acenaphthene	2/6	0/6	1/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		5-nitro Acenaphthene	0/6	0/6	1/3	0/9	0/7	0/3	1/3	0/2	0/7	0/1	0/1
		Acenaphthylene	3/6	0/6	1/3	0/9	0/7	0/3	0/4	0/14	0/7	0/1	0/1
		Anthracene	4/6	0/6	2/3	0/9	0/7	0/3	1/4	0/14	0/7	0/1	0/1
		Benz(a)anthracene	6/6	0/6	1/3	1/9	0/7	0/3	1/4	0/14	0/7	0/1	0/1
		Benzo(a)pyrene	4/6	0/6	1/3	0/9	0/7	0/3	0/4	0/14	0/7	0/1	0/1
		Benzo(b)fluoranthene	3/6	0/6	1/3	0/9	0/7	0/3	1/4	0/2	0/7	0/1	0/1
		Benzo(g,h,i)perylene	3/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	0/1	0/1
		Benzo(k)fluoranthene	4/6	0/6	1/3	0/9	0/7	0/3	1/4	0/14	0/7	0/1	0/1
		Biphenyl											
		Camphene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		1-Chloronaphthalene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2-Chloronaphthalene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		Chrysene	5/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	0/1	0/1
		Dibenz(a,h)anthracene	3/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	0/1	0/1
		Fluoranthene	6/6	1/6	2/3	1/9	0/7	0/3	1/4	0/14	0/7	0/1	0/1
		Fluorene	4/6	1/6	1/3	0/9	0/7	0/3	0/4	0/14	0/7	0/1	0/1

TABLE 2: IRON AND STEEL PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED	COKE MAKING	IRON MAKING	STEEL MAKING WET	HOT FORMING	COLD FORMING	LASCO	ATLAS	ALGOMA FINAL EFFLUENT	STELCO HILTON WORKS	STELCO LEW PROCESS	STELCO LEW FINAL
19	Extractables, Base Neutral (continued)	Indeno(1,2,3-cd)pyrene	2/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	0/1	0/1
		Indole	2/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		1-Methylnaphthalene	2/6	0/6	1/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2-Methylnaphthalene	3/6	0/6	1/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		Naphthalene	5/6	0/6	0/3	0/9	2/7	0/3	0/4	0/14	0/7	0/1	0/1
		Perylene	1/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		Phenanthrene	5/6	2/6	3/3	1/9	0/7	0/3	1/4	0/2	0/7	0/1	0/1
		Pyrene	6/6	1/6	2/3	1/9	0/7	0/3	1/4	0/14	0/7	0/1	0/1
		Benzyl butyl phthalate	1/6	1/6	1/3	2/9	0/7	0/3	1/4	0/2	0/7	1/1	1/1
		Bis(2-ethylhexyl) phthalate	2/6	1/6	2/3	4/9	3/7	1/3	1/4	1/14	1/7	1/1	1/1
		Di-n-butyl phthalate	2/6	1/6	2/3	3/9	4/7	1/3	1/4	1/14	0/7	0/1	0/1
		4-Bromophenyl phenyl ether	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		4-Chlorophenyl phenyl ether	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		Bis(2-chloroisopropyl)ether	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		Bis(2-chloroethyl)ether	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		Diphenyl ether	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,4-Dinitrotoluene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,6-Dinitrotoluene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		Bis(2-chloroethoxy)methane	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		Diphenylamine	0/6	0/6	0/3	0/9	0/7	0/3	1/4	0/2	0/7	0/1	0/1
		N-Nitrosodiphenylamine	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		N-Nitrosodi-n-propylamine	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
20	Extractables, Acid (Phenolics	2,3,4,5-Tetrachlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,3,4,6-Tetrachlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,3,5,6-Tetrachlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,3,4-Trichlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,3,5-Trichlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,4,5-Trichlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,4,6-Trichlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	1/14	0/7	0/1	0/1
		2,4-Dimethyl phenol	3/6	1/6	0/3	0/9	0/7	0/3	0/4	3/14	0/7	0/1	0/1
		2,4-Dinitrophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,4-Dichlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,6-Dichlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		4,6-Dinitro-o-cresol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2-Chlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	0/1	0/1
		4-Chloro-3-methylphenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1

TABLE 2: IRON AND STEEL PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED	COKE MAKING	IRON MAKING	STEEL MAKING WET	HOT FORMING	COLD FORMING	LASCO	ATLAS	ALGOMA FINAL EFFLUENT	STELCO HILTON WORKS	STELCO LEW PROCESS	STELCO LEW FINAL
20	Extractables, Acid (Phenolics (continued)	4-Nitrophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		m-Cresol	0/6	1/6	0/3	0/9	1/7	0/3	0/4	0/14	0/7	0/1	0/1
		o-Cresol	2/6	1/6	1/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		p-Cresol	2/6	1/6	1/3	0/9	1/7	0/3	0/4	0/14	0/7	0/1	0/1
		Pentachlorophenol	1/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	0/1	0/1
		Phenol	2/6	2/6	0/3	0/9	2/7	0/3	0/4	0/14	0/7	0/1	0/1
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene	0/6	0/6	0/3	0/9	2/7	0/2	0/4	0/2	2/7	0/2	0/2
		1,2,3,5-Tetrachlorobenzene	0/6	0/6	0/3	0/9	0/7	0/2	0/4	0/2	0/7	0/2	0/2
		1,2,4,5-Tetrachlorobenzene	0/6	0/6	0/3	1/9	0/7	0/2	0/4	0/2	2/7	0/2	0/2
		1,2,3-Trichlorobenzene	1/6	3/6	1/3	6/9	1/7	1/2	0/4	0/2	3/7	0/2	0/2
		1,2,4-Trichlorobenzene	2/6	3/6	2/3	5/9	6/7	2/2	0/4	2/14	6/7	0/2	1/2
		2,4,5-Trichlorotoluene	1/6	0/6	0/3	0/9	1/7	0/2	0/4	0/2	0/7	0/2	0/2
		Hexachlorobenzene	2/6	1/6	0/3	0/9	3/7	0/2	0/4	0/2	2/7	0/2	0/2
		Hexachlorobutadiene	2/6	1/6	1/3	4/9	2/7	1/2	1/4	0/2	1/7	0/2	0/2
		Hexachlorocyclopentadiene	0/6	0/6	0/3	3/9	1/7	0/2	0/4	0/2	0/7	1/2	1/2
		Hexachloroethane	0/6	0/6	1/3	3/9	0/7	0/2	1/4	1/2	0/7	2/2	1/2
		Octachlorostyrene	1/6	0/6	0/3	1/9	2/7	0/2	0/4	0/2	0/7	0/2	0/2
		Pentachlorobenzene	0/6	1/6	0/3	2/9	1/7	1/2	0/4	0/2	2/7	0/2	0/2
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Octachlorodibenzo-p-dioxin	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Octachlorodibenzofuran	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Total heptachlorinated dibenzo-p-dioxins	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Total heptachlorinated dibenzofurans	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Total hexachlorinated dibenzo-p-dioxins	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Total hexachlorinated dibenzofurans	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Total pentachlorinated dibenzo-p-dioxins	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Total pentachlorinated dibenzofurans	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Total tetrachlorinated dibenzo-p-dioxins	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Total tetrachlorinated dibenzofurans	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1

TABLE 2: IRON AND STEEL PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED	COKE MAKING	IRON MAKING	STEEL MAKING WET	HOT FORMING	COLD FORMING	LASCO	ATLAS	ALGOMA FINAL EFFLUENT	STELCO HILTON WORKS	STELCO LEW PROCESS	STELCO LEW FINAL
26	Fatty and Resin Acids	Abietic acid	1/4	0/3	0/3	1/9	2/7	0/2	0/3	0/2	0/6	0/1	0/1
		Chlorodehydroabietic acid	0/4	0/3	0/3	NA	NA	0/2	0/3	0/2	0/6	0/1	0/1
		Dehydroabietic acid	0/4	0/3	0/3	0/9	2/7	0/2	0/3	0/2	0/6	0/1	0/1
		Isopimaric acid	1/4	0/3	0/3	0/9	3/7	0/2	0/3	0/2	0/6	0/1	0/1
		Levopimaric acid	0/4	0/3	0/3	0/9	1/7	0/2	0/3	0/2	0/6	0/1	0/1
		Neoabietic acid	0/4	0/3	0/3	0/9	0/7	0/2	0/3	0/2	0/6	0/1	0/1
		Oleic acid	1/4	2/3	0/3	7/9	5/7	0/2	0/3	0/2	0/6	0/1	0/1
		Pimaric acid	0/4	0/3	0/3	0/9	1/7	0/2	0/3	0/2	0/6	0/1	0/1
27	Polychlorinated Biphenyls (PCBs) (Total)	PCBs (Total)	0/4	1/3	0/3	2/9	0/9	0/2	2/4	0/14	3/6	0/1	0/1

TABLE 3: IRON AND STEEL PRE-REGULATION MONITORING - PARAMETERS THAT EXCEEDED MOE MDL

ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED	COKE MAKING	IRON MAKING	STEEL MAKING WET	HOT FORMING	COLD FORMING	LASCO	ATLAS	ALGOMA FINAL EFFLUENT	STELCO HILTON FINAL EFFLUENT	STELCO LEW PROCESS	STELCO LEW FINAL
9	Total metals	Aluminum	X	X	X	X		X	X	X	X	X	
		Beryllium											
		Cadmium	X										
		Chromium	X				X		X		X		
		Cobalt											
		Copper	X			X	X	X	X	X	X		
		Lead		X					X		X	X	
		Molybdenum		X	X	X		X	X		X	X	
		Nickel					X	X	X		X		
		Silver											
		Thallium											
		Vanadium											
		Zinc	X	X	X	X	X	X	X	X	X	X	
10	Hydrides	Antimony											
		Arsenic	X	X			X			X			
		Selenium	X							X			
12	Mercury	Mercury	X										
18	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane											
		1,1,2-Trichloroethane											
		1,1-Dichloroethane					X						
		1,1-Dichloroethylene											
		1,2-Dichlorobenzene											
		1,2-Dichloroethane (Ethylene dichloride)											
		1,2-Dichloropropane											
		1,3-Dichlorobenzene											
		1,4-Dichlorobenzene											
		Bromoform				X					X	X	X
		Bromomethane									X	X	X
		Carbon tetrachloride											
		Chlorobenzene											
		Chloroform		X		X	X				X	X	X
		Chloromethane			X								
		Cis-1,3-Dichloropropylene											
		Dibromochloromethane									X	X	X

TABLE 3: IRON AND STEEL PRE-REGULATION MONITORING - PARAMETERS THAT EXCEEDED MDL

	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED	COKE MAKING	IRON MAKING	STEEL MAKING WET	HOT FORMING	COLD FORMING	LASCO	ATLAS	ALGOMA FINAL EFFLUENT	STELCO HILTON FINAL EFFLUENT	STELCO LEW PROCESS	STELCO LEW FINAL
16	Volatiles, Halogenated (continued)	Ethylene dibromide											
		Methylene chloride	X	X	X	X					X	X	X
		Tetrachloroethylene (Perchloroethylene)											
		Trans-1,2-Dichloroethylene											
		Trans-1,3-Dichloropropylene											
		Trichloroethylene											
		Trichlorofluoromethane											
		Vinyl chloride (Chloroethylene)											
17	Volatiles, Non-Halogenated	Benzene	X							X	X	X	X
		Styrene	X	X						X	X		X
		Toluene	X	X						X			X
		o-Xylene	X							X			
		m-Xylene and p-Xylene	X							X			
18	Extractables, Base Neutral	Acenaphthene			X								
		5-nitro Acenaphthene			X								
		Acenaphthylene	X		X				X				
		Anthracene	X										
		Benz(a)anthracene	X		X	X			X				
		Benzo(a)pyrene	X		X								
		Benzo(b)fluoranthene	X		X				X				
		Benzo(g,h,i)perylene	X										
		Benzo(k)fluoranthene	X		X				X				
		Biphenyl											
		Camphene											
		1-Chloronaphthalene											
		2-Chloronaphthalene											
		Chrysene	X										
		Dibenz(a,h)anthracene	X										
		Fluoranthene	X		X	X			X		X		
		Fluorene	X		X								
		Indeno(1,2,3-cd)pyrene	X										
		Indole	X										
		1-Methylnaphthalene	X		X								
		2-Methylnaphthalene	X		X								
		Naphthalene	X								X		

TABLE 3: IRON AND STEEL PRE-REGULATION MONITORING - PARAMETERS THAT EXCEEDED MOE MDL

ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED	COKE MAKING	IRON MAKING	STEEL MAKING WET	HOT FORMING	COLD FORMING	LASCO	ATLAS	ALGOMA FINAL EFFLUENT	STELCO HILTON FINAL EFFLUENT	STELCO LEW PROCESS	STELCO LEW FINAL
19	Extractables, Base Neutral (continued)	Perylene	X										
		Phenanthrene			X	X			X				
		Pyrene			X	X			X				
		Benzyl butyl phthalate			X	X			X		X		X
		Bis(2-ethylhexyl) phthalate			X	X		X	X		X		X
		Di-n-butyl phthalate	X		X	X	X	X	X	X	X		X
		4-Bromophenyl phenyl ether											
		4-Chlorophenyl phenyl ether											
		Bis(2-chloroisopropyl)ether											
		Bis(2-chloroethyl)ether											
		Diphenyl ether											
		2,4-Dinitrotoluene											
		2,6-Dinitrotoluene											
		Bis(2-chloroethoxy)methane											
		Diphenylamine											
		N-Nitrosodiphenylamine											
		N-Nitrosodi-n-propylamine											
20	Extractables, Acid (Phenolics)	2,3,4,6-Tetrachlorophenol											
		2,3,4,6-Tetrachlorophenol											
		2,3,5,6-Tetrachlorophenol											
		2,3,4-Trichlorophenol											
		2,3,6-Trichlorophenol											
		2,4,5-Trichlorophenol											
		2,4,6-Trichlorophenol											
		2,4-Dimethyl phenol	X	X									
		2,4-Dinitrophenol											
		2,4-Dichlorophenol											
		2,6-Dichlorophenol											
		4,6-Dinitro-o-cresol											
		2-Chlorophenol											
		4-Chloro-3-methylphenol											
		4-Nitrophenol											

TABLE 3: IRON AND STEEL PRE-REGULATION MONITORING - PARAMETERS THAT EXCEEDED MOE MDL

	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED	COKE MAKING	IRON MAKING	STEEL MAKING WET	HOT FORMING	COLD FORMING	LASCO	ATLAS	ALGOMA FINAL EFFLUENT	STELCO HILTON FINAL EFFLUENT	STELCO LEW PROCESS	STELCO LEW FINAL
20	Extractables, Acid (Phenolics) (continued)	m-Cresol											
		o-Cresol	X		X								
		p-Cresol	X	X	X								
		Pentachlorophenol											
		Phenol											
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene											
		1,2,3,5-Tetrachlorobenzene											
		1,2,4,5-Tetrachlorobenzene											
		1,2,3-Trichlorobenzene											
		1,2,4-Trichlorobenzene	X		X	X	X		X	X	X		
		2,4,5-Trichlorotoluene											
		Hexachlorobenzene											
		Hexachlorobutadiene				X							
		Hexachlorocyclopentadiene									X	X	
		Hexachloroethane									X	X	
		Octachlorostyrene											
		Pentachlorobenzene											

TABLE 4

SAMPLE SIZE REQUIREMENT
(Data From Algoma Steel MISA Pilot Site Study)

POLLUTANT	% DEVIATION 5	10	15	20	25
ammonia	231	58	20	14	9
cyanide	389	97	43	25	16
phenolics	549	136	60	34	22
oil and grease	1657	414	184	103	66
zinc	1137	273	124	68	49
iron	745	186	83	47	30

TABLE 5

PROBABILITY OF DETECTING AT LEAST ONE SAMPLE ABOVE THE DETECTION LIMIT

SINGLE SAMPLE PROBABILITY OF DETECT/NON-DETECT		TOTAL NUMBER OF SAMPLES					
p	q	12	10	8	6	4	2
0.5	0.5	.999	.999	.996	.984	.937	.750
0.4	0.6	.998	.994	.983	.953	.870	.640
0.3	0.7	.986	.972	.942	.882	.759	.510
0.2	0.8	.931	.893	.832	.738	.590	.360
0.1	0.9	.717	.651	.569	.468	.344	.190
0.01	0.99	.113	.095	.077	.058	.039	.019

TABLE 6

RAINBOW TROUT TEST - PROBABILITY OF DETECTING A TOXIC EFFLUENT

N	P50KILL	P51KILL	P75KILL	P95KILL	P99KILL
1	0.5000	0.5100	0.7500	0.9500	0.9900
2	0.7500	0.7599	0.9375	0.9975	0.9999
3	0.8750	0.8824	0.9844	0.9999	1.0000
4	0.9375	0.9424	0.9961	1.0000	1.0000
5	0.9688	0.9718	0.9990	1.0000	1.0000
6	0.9844	0.9862	0.9998	1.0000	1.0000
7	0.9922	0.9932	0.9999	1.0000	1.0000
8	0.9961	0.9967	1.0000	1.0000	1.0000
9	0.9980	0.9984	1.0000	1.0000	1.0000
10	0.9990	0.9992	1.0000	1.0000	1.0000
11	0.9995	0.9996	1.0000	1.0000	1.0000
12	0.9998	0.9998	1.0000	1.0000	1.0000

N = the number of tests

P50KILL = toxic effluent if at least 50% of the fish die
P51KILL = toxic effluent if at least 51% of the fish die
P75KILL = toxic effluent if at least 75% of the fish die
P95KILL = toxic effluent if at least 95% of the fish die
P99KILL = toxic effluent if at least 99% of the fish die

TABLE 7
SUMMARY OF FREQUENCY/PARAMETER ASSIGNMENT RULES

I	**PROCESS SUBCATEGORY EFFLUENT STREAMS**		
	All Sites	Thrice Weekly:	Suspended Solids;
	Process Specific	Thrice Weekly:	Parameters on the Parameters for Routine Monitoring List allocated to specific process subcategory effluent streams;
			Total phosphorus for biological effluents;
		Monthly:	Analytical test groups that correspond to those organic priority pollutants on the Parameters for Routine Monitoring List;
II	**FINAL EFFLUENT STREAMS**		
	All Sites	Daily:	pH, suspended solids, specific conductance, and oil and grease;
		Weekly:	Parameters monitored under IMIS and total phosphorus;
	Site Specific	Thrice Weekly:	Some or all of the parameters on the Parameters for Routine Monitoring List if the final effluent stream does not receive monitored process subcategory effluent streams;
			Dissolved organic carbon for final effluent streams that are likely to contain soluble organic compounds;
		Weekly:	Dissolved organic carbon for final effluent streams that are not likely to contain soluble organic compounds;
		Monthly:	Whole analytical test group if one member of the group is above the Ministry of the Environment Method Detection limit in either the final effluent stream or any of the process subcategory effluent streams that contribute to that final effluent;

TABLE 8

POINT ESTIMATES OF THE INCREMENTAL COSTS BY PLANT FOR THE IRON AND STEEL SECTOR

	(1988 $'000)		
	Capital	Operating*	TOTAL
Algoma Steel (Sault Ste. Marie)	1,350	737	2,087
Atlas Specialty Steel (Welland)	.90	214	304
Dofasco (Hamilton)	1,982	851	2,833
IVACO Rolling Mills (L'Original)	4	24	28
LASCO (Whitby)	205	134	339
Stelco Hilton Works (Hamilton)	1,217	896	2,113
Stelco Lake Erie (Nanticoke)	273	395	668
	5,121	3,250	8,371

Totals may not add up due to rounding
* Based on commercial lab prices

Source: Ministry of the Environment, "Economic Implications of the MISA Monitoring Regulation on Ontario's Iron and Steel Sector", June, 1989.

TABLE 9

IMPACT OF MONITORING COSTS ON SELECTED FINANCIAL INDICATORS (1981-1987)

PLANT	CAPITAL EXPENDITURES			AFTER-TAX EARNINGS		
	Monitoring Capital Cost as a % of Annual Average Capital Expenditure			Monitoring Operating Cost as a % of Annual Average After-Tax Earnings (Loss)		
	Highest Year	Lowest Year	Average Over 1981-87	Highest Year	Lowest Year	Average Over 1981-87
ALGOMA CORP.	.5	5.5	1.0	.4	(22)	(3.3)
RIO ALGOM (ATLAS SPECIALTY STEELS)	.05	.08	.07	.2	1.1	.3
DOFASCO	.4	3.5	.7	.5	1.6	.7
IVACO INC. (IVACO Rolling Mills)	.00	.01	.01	.06	(.3)	.1
CO-STEEL INC. (LASCO)	.5	3.8	1.0	.4	(.4)	3.0
STELCO INC.	.4	4.6	1.0	2.2	(3.2)	4.0
SECTOR	.4	1.9	.7	.7	(8.0)	1.3

Source: Ministry of the Environment "Economic Implications of the MISA Monitoring Regulation on Ontario's Iron and Steel Sector, June, 1989".

APPENDIX II

MONITORING SCHEDULE 1: ALGOMA STEEL

CORPORATE NAME: Algoma Steel

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTED	
By-Products Area		Ammonia Benzene Benzo(a)pyrene Cyanide Naphthalene Oil and Grease Phenolics (4AAP) Suspended Solids		Analytical Test Groups 17, 19 Quality Control Samples for thrice weekly's		Quality Control Samples for monthly's		PROCESS Subcategory COKEMAKING
#2 Thickener		Ammonia Cyanide Phenolics (4AAP) Suspended Solids Zinc						PROCESS Subcategory IRONMAKING;
#1 Thickener		Ammonia Chromium Cyanide Lead Oil and Grease Phenolics (4AAP) pH Suspended Solids Zinc						PROCESS Subcategory SINTERING STEELMAKING (wet process) ACID PICKLING
Tube Mill	Conductivity Oil and Grease pH Suspended Solids	Lead Zinc	Iron Dissolved organic carbon Total Phosphorus	Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test Analytical Test Groups 2, 4a, 9, 14, 16, 18, 23	Analytical Test Groups 4b, 5b, 10, 11, 12, 15, 17, 20, 26 Open Characterization 26a, 26b, 29	Analytical Test Groups 24, 27		FINAL EFFLUENT HOT FORMING
Terminal Settling Basins	Ammonia Cyanide Conductivity Oil and Grease pH Phenolics (4AAP) Sulphide Suspended Solids	Dissolved organic carbon	Iron Total Phosphorus	Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test Analytical Test Groups 9, 10, 12, 16, 17, 19, 20, 23 Quality Control Samples for daily's, thrice weekly's and weekly's	Analytical Test Groups 4b, 5b, 11, 26 Open Characterization 26a, 26b, 29	Analytical Test Groups 24, 27 Quality Control Samples for monthly's		FINAL EFFLUENT COKEMAKING COLD FORMING

MONITORING SCHEDULE 1: ALGOMA STEEL (continued)

CORPORATE NAME: Algoma Steel

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTED	
Bar and Strip Lagoon Outfall	Conductivity Cyanide Oil and Grease pH Phenolics (4AAP) Suspended Solids Zinc	Dissolved organic carbon	Ammonia Iron Total Phosphorus	Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test Analytical Test Groups 9, 10, 16, 17, 19, 20, 23	Analytical Test Groups 4b, 5b, 11, 12, 15, 26 Open Characterization 26a, 26b, 26	Analytical Test Groups 24, 27		FINAL EFFLUENT IRON MAKING STEELMAKING ACID PICKLING SINTERING
Cold Mill 24"	pH Suspended Solids		Iron Oil and Grease	Ammonia Chromium Cyanide Dissolved organic carbon Lead Phenolics (4AAP) Total Phosphorus Zinc	Analytical Test Groups 4b, 5b, 7, 9, 10, 11, 12, 15, 16, 17, 19, 20, 23, 26 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test			COOLING WATER
Cold Mill 20"	pH Suspended Solids		Oil and Grease	Ammonia Chromium Cyanide Dissolved organic carbon Iron Lead Phenolics (4AAP) Total Phosphorus Zinc	Analytical Test Groups 4b, 5b, 7, 9, 10, 11, 12, 15, 16, 17, 19, 20, 23, 26 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test			COOLING WATER
60" Sewer Outfall	pH Suspended Solids		Iron	Ammonia Chromium Cyanide Dissolved organic carbon Lead Oil and Grease Phenolics (4AAP) Total Phosphorus Zinc	Analytical Test Groups 4b, 5b, 7, 9, 10, 11, 12, 15, 16, 17, 19, 20, 23, 26 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test			COOLING WATER

MONITORING SCHEDULE 1: ALGOMA STEEL (continued)

CORPORATE NAME: Algoma Steel

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTED	
30" Sewer Outfall	pH Suspended Solids		Iron	Ammonia Chromium Cyanide Dissolved organic carbon Lead Oil and Grease Phenolics (4AAP) Total Phosphorus Zinc	**Analytical Test Groups** 4b, 5b, 7, 9, 10, 11, 12, 15, 16, 17, 19, 20, 23, 26 **Fish Toxicity Test** **Daphnia Magna Acute Lethality Toxicity Test**	**Quality Control Samples** for monthly's and weekly's		**COOLING WATER**
#2 Steel Making Cooling Tower				Ammonia Chromium Cyanide Dissolved organic carbon Iron Lead Oil and Grease pH Phenolics (4AAP) Suspended Solids Total Phosphorus Zinc	**Analytical Test Groups** 4b, 5b, 7, 9, 10, 11, 12, 15, 16, 17, 19, 20, 23, 26 **Fish Toxicity Test** **Daphnia Magna Acute Lethality Toxicity Test**			**COOLING WATER**
Coke Oven Condenser				Ammonia Chromium Cyanide Dissolved organic carbon Iron Lead Oil and Grease pH Phenolics (4AAP) Suspended Solids Total Phosphorus Zinc	**Analytical Test Groups** 4b, 5b, 7, 9, 10, 11, 12, 15, 16, 17, 19, 20, 23, 26 **Fish Toxicity Test** **Daphnia Magna Acute Lethality Toxicity Test**			**COOLING WATER**
Boiler House				Ammonia Chromium Cyanide Dissolved organic carbon Iron Lead Oil and Grease pH Phenolics (4AAP) Suspended Solids Total Phosphorus Zinc	**Analytical Test Groups** 4b, 5b, 7, 9, 10, 11, 12, 15, 16, 17, 19, 20, 23, 26 **Fish Toxicity Test** **Daphnia Magna Acute Lethality Toxicity Test**			**COOLING WATER**

MONITORING SCHEDULE 1: ALGOMA STEEL (continued)

CORPORATE NAME: Algoma Steel

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTED	
Cold Mill Storm Sewer Outfall				Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Iron Lead Naphthalene Oil and Grease pH Phenolics (4AAP) Suspended Solids Zinc				STORM WATER

MONITORING SCHEDULE 2: ATLAS SPECIALTY STEELS

CORPORATE NAME: Atlas Steel

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTED	
Waste Acid Solidification Plant			Oil and Grease pH Suspended Solids Analytical Test Groups 9, 10, 11					PROCESS Subcategory ACID PICKLING
North Plant Treatment		Chromium Hexavalent Chromium Nickel Oil and Grease pH Suspended Solids Zinc		Quality Control Samples for thrice weekly's				PROCESS Subcategory HOT FORMING STEELMAKING (wet process) ACID PICKLING
CEVIM		Chromium Nickel Oil and Grease pH Suspended Solids Zinc						Recycled PROCESS Water for Cooling
42" Sewer	Conductivity Oil and Grease pH Suspended Solids	Dissolved organic carbon	Total Phosphorus	Analytical Test Groups 9, 16, 19, 23, IS1 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test Quality Control Samples for daily's, thrice weekly's and weekly's	Analytical Test Groups 4, 5b, 10, 11, 17, 20 Open Characterization 28a, 28b, 29	Analytical Test Groups 24, 27 Quality Control Samples for monthly's		FINAL EFFLUENT HOT FORMING STEELMAKING ACID PICKLING
Waste Disposal Site							Hexavalent Chromium Iron Nickel Oil and Grease pH Suspended Solids Zinc	WASTE DISPOSAL SITE EFFLUENT
South Plant Water Reclaim							Iron Nickel Oil and Grease pH Suspended Solids Zinc	EMERGENCY OVERFLOW

MONITORING SCHEDULE 2: ATLAS SPECIALTY STEELS

CORPORATE NAME: Atlas Steel

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTED	
North Plant Water Reclaim at 42" Sewer							Iron Nickel Oil and Grease pH Suspended Solids Zinc	EMERGENCY OVERFLOW
#3 Building				Iron Nickel Oil and Grease pH Suspended Solids Zinc				STORM WATER

MONITORING SCHEDULE 3: DOFASCO

CORPORATE NAME: Dofasco

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTED	
Coke Plant Biological Plant Discharge		Ammonia Benzene Benzo(a)Pyrene Cyanide Naphthalene Oil and Grease Phenolics (4AAP) Suspended Solids	Total Phosphorus	**Analytical Test Groups** 17, 19 **Quality Control Samples** for thrice weekly's and weekly's		**Quality Control Samples** for monthly's		**PROCESS Subcategory** **COKEMAKING**
Blast Furnace Recycle Blowdown		Ammonia Cyanide Phenolics (4AAP) Suspended Solids Zinc						**PROCESS Subcategory** **IRONMAKING**
Steelmaking Clarifier Discharge		Lead Oil and Grease Suspended Solids Zinc						**PROCESS Subcategory** **STEELMAKING (wet process)**
#1 Hot Mill Filtration Plant Discharge		Lead Oil and Grease pH Suspended Solids Zinc						**PROCESS Subcategory** **HOT FORMING**
Cold Mill Treatment Plant Discharge		Chromium Dissolved organic carbon Lead Oil and Grease pH Suspended Solids Zinc						**PROCESS Subcategory** **COLD FORMING**
Ottawa Street Sewer	Conductivity Oil and Grease pH Suspended Solids	Dissolved organic carbon	Ammonia Chromium Cyanide Iron Phenolics (4AAP) Total Phosphorus Zinc	**Fish Toxicity Test** **Daphnia Magna Acute Lethality Toxicity Test** **Analytical Test Groups** 9, 16, 18, 23	**Analytical Test Groups** 4b, 5b, 10, 11, 12, 15, 17, 20, 26 **Open Characterization** 26a, 26b, 29	**Analytical Test Groups** 24, 27		**FINAL EFFLUENT** **HOT FORMING**

MONITORING SCHEDULE 3: DOFASCO (continued)

CORPORATE NAME: Dofasco

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTED	
West Bayfront Sewer	Conductivity Oil and Grease pH Suspended Solids	Dissolved organic carbon	Ammonia Chromium Cyanide Iron Phenolics (4AAP) Total Phosphorus Zinc	**Fish Toxicity Test** **Daphnia Magna Acute Lethality Toxicity Test** **Analytical Test Groups** 9, 10, 12, 16, 17, 19, 20, 23 **Quality Control Samples** for daily's, thrice weekly's and weekly's	**Analytical Test Groups** 4b, 5b, 11, 15, 26 **Open Characterization** 28a, 28b, 29	**Analytical Test Groups** 24, 27 **Quality Control Samples** for monthly's		**FINAL EFFLUENT** **COKEMAKING** **IRONMAKING** **STEELMAKING** (wet process)
East Boat Slip Sewer	Conductivity Oil and Grease pH Suspended Solids	Dissolved organic carbon	Ammonia Chromium Cyanide Iron Phenolics (4AAP) Total Phosphorus Zinc	**Fish Toxicity Test** **Daphnia Magna Acute Lethality Toxicity Test** **Analytical Test Groups** 9, 10, 12, 16, 17, 19, 20, 23	**Analytical Test Groups** 4b, 5b, 11, 15, 26 **Open Characterization** 28a, 28b, 29	**Analytical Test Groups** 24, 27		**FINAL EFFLUENT** **COKEMAKING** **STEELMAKING** (wet process)
Boilerhouse Sewer #1			Ammonia Cyanide Chromium Iron Oil and Grease pH Phenolics (4AAP) Suspended Solids Total Phosphorus Zinc	Dissolved organic carbon Lead	**Analytical Test Groups** 4b, 5b, 7, 9, 10, 11, 12, 15, 16, 17, 19, 20, 23, 26 **Fish Toxicity Test** **Daphnia Magna Acute Lethality Toxicity Test**	**Quality Control Samples** for monthly's and weekly's		**COOLING WATER**
Boilerhouse Sewer #2				Ammonia Chromium Cyanide Dissolved organic carbon Iron Lead Oil and Grease pH Phenolics (4AAP) Suspended Solids Total Phosphorus Zinc	**Analytical Test Groups** 4b, 5b, 7, 9, 10, 11, 12, 15, 16, 17, 19, 20, 23, 26 **Fish Toxicity Test** **Daphnia Magna Acute Lethality Toxicity Test**			**COOLING WATER**

MONITORING SCHEDULE 3: DOFASCO (continued)

CORPORATE NAME: Dofasco

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTED	
Southeast Coal Fields Storm Sewer							Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Iron Lead Naphthalene Oil and Grease pH Phenolics (4AAP) Suspended Solids Zinc	STORAGE SITE EFFLUENT
Kenilworth Plant Storm Sewer				Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Iron Lead Naphthalene Oil and Grease pH Phenolics (4AAP) Suspended Solids Zinc				STORM WATER

MONITORING SCHEDULE 4: IVACO ROLLING MILLS

CORPORATE NAME: Ivaco Inc.

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTED	
East Discharge				Chromium Dissolved organic carbon Iron Lead Oil and Grease pH Suspended Solids Total Phosphorus Zinc	**Analytical Test Groups** 4, 5b, 7, 9, 10, 11, 16, 17, 19, 20, 23, 26 **Fish Toxicity Test** **Daphnia Magna Acute Lethality Toxicity Test**	**Quality Control Samples** for monthly's		**COOLING WATER**
North-East Discharge				Iron Lead Oil and Grease pH Suspended Solids Zinc				**STORM WATER**
South-East Discharge				Iron Lead Oil and Grease pH Suspended Solids Zinc				**STORM WATER**
Mill Pond Outlet							Lead Oil and Grease pH Suspended Solids Zinc **Quality Control Samples** for the event	**PROCESS subcategory** **HOT FORMING**

MONITORING SCHEDULE 4: IVACO ROLLING MILLS (continued)

CORPORATE NAME: Ivaco Inc.

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTED	
East Discharge							Conductivity Lead Oil and Grease pH Suspended Solids Zinc Analytical Test Groups 24, 27 Open Characterization 26a, 26b, 29 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test Quality Control Samples for the event	FINAL EFFLUENT HOT FORMING

MONITORING SCHEDULE 5: LAKE ONTARIO STEEL DIVISION OF CO - STEEL INC.

CORPORATE NAME: Lasco

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTED	
South Pond	Conductivity Oil and Grease pH Suspended Solids	Lead Zinc	Dissolved organic carbon Iron Total Phosphorus	**Analytical Test Groups** 8, 16, 19, 23 **Fish Toxicity Test** **Daphnia Magna Acute Lethality Toxicity Test** **Quality Control Samples** for daily's, thrice weekly's and weekly's	**Analytical Test Groups** 4, 5b, 10, 11, 17, 20, 26 **Open Characterization** 28a, 28b, 29	**Analytical Test Groups** 24, 27 **Quality Control Samples** for monthly's		**FINAL EFFLUENT** **HOT FORMING**
Storm Water Discharge Point				Iron Lead Oil and Grease pH Suspended Solids Zinc				**STORM WATER**
Waste Disposal Site							Iron Lead Oil and Grease pH Suspended Solids Zinc	**WASTE DISPOSAL SITE EFFLUENT**

MONITORING SCHEDULE 6: STELCO STEEL HILTON WORKS

CORPORATE NAME: Stelco Hilton

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTED	
#2 Rod Mill	Conductivity Oil and Grease pH Suspended Solids	Lead Zinc	Dissolved organic carbon Iron Phenolics (4AAP) Total Phosphorus	Analytical Test Groups 2, 4a, 9, 16, 19, 23 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test	Analytical Test Groups 4b, 5b, 10, 11, 12, 15, 17, 20, 26 Open Characterization 26a, 26b, 29	Analytical Test Groups 24, 27		FINAL EFFLUENT HOT FORMING
20" Mill	Conductivity Oil and Grease pH Suspended Solids	Lead Zinc	Dissolved organic carbon Iron Phenolics (4AAP) Total Phosphorus	Analytical Test Groups 9, 16, 19, 23 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test	Analytical Test Groups 2, 4, 5b, 10, 11, 12 15, 17, 20, 26 Open Characterization 26a, 26b, 29	Analytical Test Groups 24, 27		FINAL EFFLUENT HOT FORMING
East Side Filter Plant	Conductivity Oil and Grease pH Suspended Solids	Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Dissolved organic carbon Lead Naphthalene Phenolics (4AAP) Zinc	Iron Total Phosphorus	Analytical Test Groups 9, 10, 12, 16, 17, 19, 20, 23 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test Quality Control Samples for daily's, thrice weekly's and weekly's	Analytical Test Groups 4b, 5b, 11, 15, 26 Open Characterization 26a, 26b, 29	Analytical Test Groups 24, 27 Quality Control Samples for monthly's		FINAL EFFLUENT COKEMAKING SINTERING HOT FORMING COLD FORMING STEELMAKING (wet process)
North Outfall	Conductivity Oil and Grease pH Suspended Solids	Dissolved organic carbon Lead Zinc	Ammonia Cyanide Iron Phenolics (4AAP) Total Phosphorus	Analytical Test Groups 9, 16, 19, 23 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test	Analytical Test Groups 4b, 5b, 10, 11, 12, 15, 17, 20, 26 Open Characterization 26a, 26b, 29	Analytical Test Groups 24, 27		FINAL EFFLUENT HOT FORMING

MONITORING SCHEDULE 6: STELCO STEEL HILTON WORKS (continued)

CORPORATE NAME: Stelco Hilton

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTED	
West-Side Open Cut			Ammonia Cyanide Iron Oil and Grease Phenolics (4AAP) Suspended Solids Zinc	Chromium Dissolved organic carbon Lead pH Total Phosphorus	**Analytical Test Groups** 4b, 5b, 7, 9, 10, 11, 12, 15, 16, 17, 19, 20, 23, 26 **Fish Toxicity Test** **Daphnia Magna Acute Lethality Toxicity Test**	**Quality Control Samples** for monthly's and weekly's		COOLING WATER
North-West Outfall			Ammonia Cyanide Iron Oil and Grease Phenolics (4AAP) Suspended Solids Zinc	Chromium Dissolved organic carbon Lead pH Total Phosphorus	**Analytical Test Groups** 4b, 5b, 7, 9, 10, 11, 12, 15, 16, 17, 19, 20, 23, 26 **Fish Toxicity Test** **Daphnia Magna Acute Lethality Toxicity Test**			COOLING WATER
#1 60" Sewer	Conductivity Oil and Grease pH Suspended Solids	Chromium Dissolved organic carbon Lead Zinc	Total Phosphorus	**Fish Toxicity Test** **Daphnia Magna Acute Lethality Toxicity Test** **Analytical Test Groups** 9, 10, 16, 23, 151	**Analytical Test Groups** 2, 4, 5b, 11, 12, 14, 15, 17, 19, 20, 26 **Open Characterization** 26a, 26b, 29	**Analytical Test Groups** 24, 27		FINAL EFFLUENT ACID PICKLING
# 2 60" Sewer				Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Iron Lead Naphthalene Oil and Grease pH Phenolics (4AAP) Suspended Solids Zinc				STORM WATER

MONITORING SCHEDULE 6: STELCO STEEL HILTON WORKS (continued)

CORPORATE NAME: Stelco Hilton

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTED	
East Side Filter Plant Overflow Weir							Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Iron Lead Naphthalene Oil and Grease pH Phenolics (4AAP) Suspended Solids Zinc	EMERGENCY OVERFLOW

MONITORING SCHEDULE 7: STELCO STEEL LAKE ERIE WORKS

CORPORATE NAME: Stelco Lake Erie Works

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTED	
Blowdown Treatment Plant		Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Lead Naphthalene Oil and Grease pH Phenolics (4AAP) Suspended Solids Zinc	Total Phosphorus	**Analytical Test Groups** 17, 19 **Quality Control Samples** for thrice weekly's and weekly's		**Quality Control Samples** for monthly's		**PROCESS Subcategory** **COKEMAKING** **IRONMAKING** **STEELMAKING (wet process)** **HOT FORMING**
#4 Pond Discharge	Conductivity Oil and Grease pH Suspended Solids	Dissolved organic carbon	Ammonia Cadmium Cyanide Phenolics (4AAP) Total Phosphorus	**Fish Toxicity Test** **Daphnia Magna Acute Lethality Toxicity Test** **Analytical Test Groups** 9, 10, 12, 16, 17, 19, 20, 23, IS1 **Quality Control Samples** for daily's, thrice weekly's and weekly's	**Analytical Test Groups** 4b, 5b, 11, 15, 26 **Open Characterization** 26a, 26b, 29	**Analytical Test Groups** 24, 27 **Quality Control Samples** for monthly's		**FINAL EFFLUENT** **COKEMAKING** **IRONMAKING** **STEELMAKING (wet process)** **HOT FORMING**
Storm Water Pond #2				Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Iron Lead Naphthalene Oil and Grease pH Phenolics (4AAP) Suspended Solids Zinc				**STORM WATER**
Lagoon E							Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Iron Lead Naphthalene Oil and Grease pH Phenolics (4AAP) Sulphide Suspended Solids Zinc	**WASTE DISPOSAL SITE EFFLUENT**

MONITORING SCHEDULE 7: STELCO STEEL LAKE ERIE WORKS (continued)

CORPORATE NAME: Stelco Lake Erie Works

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTED	
Coal Storage Area							Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Iron Lead Naphthalene Oil and Grease pH Phenolics (4AAP) Suspended Solids Zinc	STORAGE SITE EFFLUENT

PART III

THE EFFLUENT MONITORING REGULATION FOR THE IRON AND STEEL SECTOR

ONTARIO REGULATION 321/89

under the Environmental Protection Act

EFFLUENT MONITORING - IRON AND STEEL MANUFACTURING SECTOR

REGULATION MADE UNDER THE ENVIRONMENTAL PROTECTION ACT

EFFLUENT MONITORING - IRON AND STEEL MANUFACTURING SECTOR

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REGULATION MADE UNDER THE
ENVIRONMENTAL PROTECTION ACT

EFFLUENT MONITORING - IRON AND STEEL MANUFACTURING SECTOR

Definitions

1.-(1) In this Regulation,

"acid pickling" means the chemical removal of oxides and scale from the surface of steel by the action of water solutions and inorganic acids;

"characterization" in relation to a plant, means the analysis of a sample for all of the parameters specified in the characterization parameters schedule for that plant;

"cold forming" means the steel forming process in which cold steel is transformed in size and shape through a series of forming steps;

"cokemaking" means the production of coke from coal in coking ovens;

"cooling water" means water and associated material that is used in an industrial process for the purpose of removing heat, that is not intended to come into contact with process materials, and that is discharged to a surface watercourse;

"cooling water effluent stream" means cooling water that flows through an open or closed channel;

"cooling water sampling point" means a location in a cooling water effluent stream situated before the place of discharge to a surface watercourse;

"final effluent" means any effluent that contains process subcategory effluent and one or more of cooling water, storm water and waste disposal site effluent;

"final effluent sampling point" means a location in a final effluent stream situated before the place of discharge to a surface watercourse;

"final effluent stream" means a final effluent that flows through an open or closed channel;

"final treatment" means the last treatment of an effluent before that effluent is discharged to a surface watercourse;

"General Effluent Monitoring Regulation" means Ontario Regulation 695/88;

"hot forming" means the steel forming process in which hot steel is transformed in size and shape through a series of forming steps to produce semi-finished and finished steel products;

"ironmaking" means the production of molten iron by the reduction of iron ore, sinter and steel slag;

"open characterization" in relation to a plant, means the analysis of a sample,

(a) to identify and quantify all of the parameters in analytical test groups 16, 17, 19, 20 and 23 as indicated in the characterization parameters schedule for that plant, and

(b) to identify and to determine the approximate quantity of all of the parameters in analytical test groups 28a, 28b and 29 as indicated in Schedule C to this Regulation;

"process change" means a change in equipment, production process or treatment process;

"process subcategory" means any of the processes of cokemaking, sintering, ironmaking, steelmaking wet process, cold forming, hot forming, salt bath descaling and acid pickling;

"process subcategory effluent" means any effluent that is generated by a process subcategory;

"process subcategory effluent sampling point" means a location in a process subcategory effluent stream situated,

(a) upstream of any significant contaminant masking or significant dilution from any other effluent stream, and

(b) after any treatment other than final treatment and before any final treatment;

"process subcategory effluent stream" means a process subcategory effluent that flows through an open or closed channel;

"quarterly" means once in each three month period beginning on the first day of January, April, July and October;

"salt bath descaling" means the processing of specialty steel products in molten salt solutions in order to remove scale;

"semi-annually" means once in each six month period beginning on the first day of January and July;

"sintering" means the production of an iron ore agglomerate for use as a feed material in making iron;

"steelmaking wet process" means the production of steel in basic oxygen or electric arc furnaces using wet gas cleaning methods;

"storage site" means land owned, occupied or managed by a direct discharger and used to store coal or coke;

"storage site effluent" means any liquid and associated material that is collected from a storage site for discharge to a surface watercourse;

"storage site effluent sampling point" means a location in a storage site effluent stream situated,

(a) before any place of discharge to a surface watercourse,

(b) upstream of significant dilution from any other effluent stream, and

(c) after any final treatment;

"storage site effluent stream" means storage site effluent that flows through an open or closed channel;

"treatment" means the use of a physical, chemical or biological process or any combination thereof, to condition an effluent;

"waste disposal site effluent" means any liquid and associated material from a waste disposal site that has been in contact with waste and that is collected for discharge to a surface watercourse.

(2) The definitions in section 1 of the General Effluent Monitoring Regulation that are not redefined in this Regulation apply to this Regulation.

Purpose

2. The purpose of this Regulation is to establish a data base on effluent quality in the iron and steel sector that will be used, along with other pertinent information, to develop effluent limits for the iron and steel sector.

Application

3.-(1) This Regulation applies only with respect to the plants listed in subsection (2) and only with respect to the effluent streams named in the site-specific monitoring schedules for those plants.

(2) The characterization parameters schedule and the site-specific monitoring schedule for each plant are as follows:

Plant	Location	Owner as of the 21st of April, 1989	Characterization Parameters Schedule	Site-Specific Monitoring Schedule
Algoma Steel	Sault Ste. Marie	Dofasco Inc.	A	1
Atlas Specialty Steels	City of Welland	Rio Algom Limited	B	2
Dofasco	City of Hamilton	Dofasco Inc.	A	3
Ivaco Rolling Mills	L'Orignal	Ivaco Inc.	B	4
Lasco	Town of Whitby	Co-Steel International Limited	B	5
Stelco Steel Hilton Works	City of Hamilton	Stelco Inc.	A	6
Stelco Steel Lake Erie Works	City of Nanticoke	Stelco Inc.	A	7

(3) This Regulation is a Sectoral Effluent Monitoring Regulation within the meaning of the General Effluent Monitoring Regulation.

(4) Each direct discharger shall carry out the monitoring obligations, including the sampling, analysis, toxicity testing, flow measurement, recording and reporting obligations of this Regulation, in accordance with the General Effluent Monitoring Regulation and in accordance with the sampling principles specified in Schedule D to this Regulation and the analytical principles specified in Schedule E to this Regulation.

(5) Each direct discharger shall carry out the monitoring obligations of this Regulation using the analytical method detection limits specified in column 6 of Schedule 3 to the General Effluent Monitoring Regulation and in Schedule E to this Regulation.

(6) Each direct discharger shall carry out the sampling and analytical obligations in relation to ethylbenzene and di-n-octyl phthalate in accordance with Notes 2 and 3 to the characterization parameters schedule for that discharger's plant.

(7) An obligation on a direct discharger to do a thing under this Regulation is discharged if another person has done it on the direct discharger's behalf.

(8) A reference in the General Effluent Monitoring Regulation to an effluent stream or sampling point of a type listed in Column A is, for the purposes of this Regulation, deemed to be a reference to an effluent stream or sampling point of the type listed opposite it in Column B:

COLUMN A	COLUMN B
Process effluent	Process subcategory effluent
Combined effluent	Final effluent
Once-through cooling water	Cooling water

(9) Each direct discharger shall carry out the monitoring obligations, including the sampling, analysis, flow measurement, recording and reporting obligations of this Regulation in relation to storage site effluent in accordance with the methods specified in the General Effluent Monitoring Regulation in relation to waste disposal site effluent.

(10) Each direct discharger shall collect each sample required to be collected from a process subcategory or final effluent sampling point as a composite sample throughout an operating day in accordance with subsection 3(4) of the General Effluent Monitoring Regulation.

(11) Where a sample is collected from a process subcategory effluent sampling point, a cooling water sampling point or a final effluent sampling point for analysis for parameters in analytical test groups 15 to 17 and 28a, the sample shall consist of a single grab sample.

(12) In the event that, on any day, because of the collection of inspection samples or because of insufficient flow, a direct discharger cannot collect a sufficient volume of sample from a sampling point to perform all of the analyses required to be performed on that day on samples collected from that sampling point, the discharger shall collect a set of samples sufficient to perform all of those analyses from that sampling point on the next operating day on which such collection is possible, and shall perform thereon all of those analyses.

Sampling Points

4.-(1) Each direct discharger shall, by the 8th day of August, 1989, establish a sampling point on each effluent stream named in the site-specific monitoring schedule for that discharger's plant, as follows:

1. A cooling water sampling point on each cooling water effluent stream.

2. An emergency overflow effluent sampling point on each emergency overflow effluent stream.

3. A final effluent sampling point on each final effluent stream.

4. A process subcategory effluent sampling point on each process subcategory effluent stream.

5. A storage site effluent sampling point on each storage site effluent stream.

6. A storm water sampling point on each storm water effluent stream.

7. A waste disposal site effluent sampling point on each waste disposal site effluent stream.

(2) Each direct discharger shall use the sampling points established under subsection (1) for all sampling required by this Regulation, except that a direct discharger may use alternate sampling points where that is acceptable to the Director.

(3) Except as otherwise specifically provided, sets of samples required to be collected under this Regulation need not be collected on the same day.

5.-(1) Each direct discharger shall, if final effluent samples are collected under section 10 in that discharger's plant, collect a set of samples from each final effluent sampling point of that discharger once during each of the months of January, April, July and October, and shall, subject to subsection (11), perform a characterization on each such set.

(2) Each direct discharger shall, if final effluent samples are collected under section 10 in that discharger's plant, collect a set of samples sufficient to perform the analyses required by subsection (3) from each final effluent sampling point of that discharger semi-annually.

(3) Each direct discharger shall analyze each set of samples collected under subsection (2) for the parameters in analytical test groups 24 and 27, as indicated in the characterization parameters schedule for that discharger's plant.

(4) For the purposes of subsection (2), samples collected from a sampling point after the first sample is collected from that sampling point under subsection (2) shall be collected no sooner than 180 days after the previous sampling under subsection (2) from that sampling point.

(5) Each direct discharger shall collect a set of samples from each final effluent sampling point of that discharger once within thirty days after every process change that may adversely affect the quality of the effluent at that point, and shall perform a characterization on each such set.

(6) Each direct discharger shall, if final effluent samples are collected under section 10 in that discharger's plant, collect a set of samples during each of the months of February, May, August and November from each final effluent sampling point of that discharger, and shall perform an open characterization on each such set.

(7) Each direct discharger shall ensure that each collection of samples from a sampling point under subsection (1) is separated by at least fifteen days from each collection of samples from that sampling point under subsection (6).

(8) If final effluent samples are not collected under section 10 in a direct discharger's plant, that discharger shall, for each emergency, maintenance activity or malfunction in respect of which final effluent samples are collected under section 13, on a day on which a final effluent sample is collected under section 13 in respect of that event, collect a set of samples from each final effluent sampling point of that discharger from which samples are collected under section 13 on that day and shall,

(a) perform an open characterization on each such set; and

(b) analyze each such set for the parameters in analytical test groups 24 and 27 as indicated in the characterization parameters schedule for that discharger's plant.

(9) Once in each quarter, each direct discharger shall collect a set of samples from each cooling water sampling point of that discharger and shall, subject to subsection (11), perform a characterization on each such set.

(10) Each set of samples collected under subsection (9) shall be collected on one of the days on which samples are collected under subsection 11(1).

(11) In performing the analyses required by subsections (1) and (9), the direct discharger need not analyze for parameters in analytical test groups 24 and 27 as indicated in the characterization parameters schedule for that discharger's plant.

(12) For the purposes of subsection 4(3) of the General Effluent Monitoring Regulation, samples collected under this section are collected for characterization.

(13) Each set of samples collected under this section shall be collected on an operating day.

Daily Monitoring

6.-(1) During each operating day, each direct discharger shall collect a set of samples sufficient to perform the analyses required by subsection (2) from each sampling point of that discharger.

(2) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters indicated in the column marked "D", for the stream from which the set was collected, of the site-specific monitoring schedule for that discharger's plant.

Thrice-Weekly Monitoring

7.-(1) On three operating days in each week, each direct discharger shall collect a set of samples sufficient to perform the analyses required by subsection (2) from each sampling point of that discharger.

(2) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters indicated in the column marked "TW", for the stream from which the set was collected, of the site-specific monitoring schedule for that discharger's plant.

Weekly Monitoring

8.-(1) On one operating day in each week, each direct discharger shall collect a set of samples sufficient to perform the analyses required by subsection (2) from each sampling point of that discharger.

(2) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters indicated in the column marked "W", for the stream from which the set was collected, of the site-specific monitoring schedule for that discharger's plant.

(3) Each set of samples collected under subsection (1) shall be collected on one of the days on which a sample is collected under subsection 7(1) from the same sampling point, if a sample is collected from that sampling point under subsection 7(1) in the week.

(4) For the purposes of subsection (1), samples collected from a sampling point after the first sample is collected from that sampling point under subsection (1) shall be collected no sooner than two days after the previous sampling under subsection (1) from that sampling point.

Extended Weekly Monitoring

9.-(1) On one operating day in each week, each direct discharger shall collect a set of samples sufficient to perform the analyses required by subsection (2) from each final effluent sampling point of that discharger.

(2) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters in analytical test groups 2, 3, 4a, 5a, 6, 7, 8, 9, 14, 15, 25 and IS1 indicated in the columns marked "D", "TW" and "W", for the stream from which the set was collected, of the site-specific monitoring schedule for that discharger's plant.

(3) For the purposes of subsection (1), samples collected from a sampling point after the first sample is collected from that sampling point under subsection (1) shall be collected no sooner than two days after the previous sampling under subsection (1) from that sampling point.

Monthly Monitoring

10.-(1) On one operating day in each month, each direct discharger shall collect a set of samples sufficient to perform the analyses required by subsection (2) from each process subcategory effluent and final effluent sampling point of that discharger.

(2) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters indicated in the column marked "M", for the stream from which the set was collected, of the site-specific monitoring schedule for that discharger's plant.

(3) Each set of samples collected under subsection (1) shall be collected on one of the days on which a sample is collected under subsection 8(1) from the same sampling point, if a sample is collected from that sampling point under subsection 8(1) in the month.

(4) Each set of samples collected under subsection (1) shall be collected on one of the days on which a sample is collected under subsection 7(1) from the same sampling point, if a sample is collected from that sampling point under subsection 7(1) in the month.

(5) For the purposes of subsection (1), samples collected from a sampling point after the first sample is collected from that sampling point under subsection (1) shall be collected no sooner than two weeks after the previous sampling under subsection (1) from that sampling point.

Monthly Monitoring - Cooling Water

11.-(1) On one operating day in each month, each direct discharger shall collect a set of samples sufficient to perform the analyses required by subsection (2) from each cooling water sampling point of that discharger.

(2) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters indicated in the column marked "M", for the cooling water effluent stream from which the set was collected, of the site-specific monitoring schedule for that discharger's plant.

(3) Each set of samples collected under subsection (1) shall be collected on one of the days on which a sample is collected under subsection 10(1), if samples are collected under subsection 10(1) in the direct discharger's plant.

Monthly Monitoring - Storm Water

12.-(1) On one operating day in each month in which there is a storm event or a thaw on an operating day, during a storm water discharge related to a storm event or thaw, each direct discharger shall collect a set of samples from each storm water sampling point of that discharger that is affected by the storm event or thaw, sufficient to perform the analyses required by subsection (2).

(2) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters indicated in the column marked "M", for the stream from which the set was collected, of the site-specific monitoring schedule for that discharger's plant.

(3) Where a direct discharger has been unable to collect a set of samples from a storm water sampling point as required by subsection (1) because of insufficient flow, the discharger shall collect a compensating set of samples from that sampling point during the next storm water discharge in respect of which the flow is sufficient and in respect of which a set of samples is not collected under subsection (1) and shall analyze the compensating set for the parameters referred to in subsection (2).

(4) The discharge of storm water referred to in subsection (3) shall be related to a storm event or thaw that affects the sampling point from which the compensating set of samples is collected.

Event-Oriented Monitoring

13.-(1) During each operating day on which process subcategory effluent and final effluent are discharged due to an emergency, a maintenance activity or a malfunction in a direct discharger's plant, each direct discharger shall, during the discharges, collect grab samples sufficient to perform the analyses required by subsection (2) from each affected process subcategory effluent and final effluent sampling point of that discharger.

(2) Each direct discharger shall analyze each grab sample collected under subsection (1) for the parameters indicated in the column marked "event oriented", for the stream from which the grab sample was collected, of the site-specific monitoring schedule for that discharger's plant.

Storage Site Effluent Monitoring

14.-(1) During each discharge of storage site effluent, each direct discharger shall collect a set of samples from each affected storage site effluent sampling point of that discharger sufficient to perform the analyses required by subsection (3).

(2) The collection required by subsection (1) need not occur more frequently than twice in one month, or more frequently than twelve times in one year.

(3) Each direct discharger shall analyze the samples collected under subsection (1) for the parameters indicated in the column marked "event oriented", for the stream from which the set was collected, of the site-specific monitoring schedule for that discharger's plant.

Waste Disposal Site Effluent Monitoring

15.-(1) During each discharge of waste disposal site effluent, each direct discharger shall collect a set of samples from each affected waste disposal site effluent sampling point of that discharger sufficient to perform the analyses required by subsection (3).

(2) The collection required by subsection (1) need not occur more frequently than twice in one month, or more frequently than twelve times in one year.

(3) Each direct discharger shall analyze the samples collected under subsection (1) for the parameters indicated in the column marked "event oriented", for the stream from which the set was collected, of the site-specific monitoring schedule for that discharger's plant.

Emergency Overflow Effluent Monitoring

16.-(1) During each emergency overflow, each direct discharger shall collect a set of samples sufficient to perform the analyses required by subsection (3) from each affected emergency overflow effluent sampling point of that discharger.

(2) Subsection (1) does not apply if the collection of samples would result in danger to health or safety.

(3) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters indicated in the column marked "event oriented", for the stream from which the set was collected, of the site-specific monitoring schedule for that discharger's plant.

Quality Control Monitoring

17.-(1) Once in each month, on a day on which samples are collected under section 10, each direct discharger shall collect a duplicate sample for each sample collected on that day under sections 6 to 8 from the process subcategory and final effluent streams indicated as requiring quality control monitoring in the site-specific monitoring schedule for that discharger's plant.

(2) Each direct discharger shall analyze each duplicate sample collected under subsection (1) for a sample collected under section 6 for the parameters indicated in the column marked "D", each duplicate sample collected under subsection (1) for a sample collected under section 7 for the parameters indicated in the column marked "TW", and each duplicate sample collected under subsection (1) for a sample collected under section 8 for the parameters indicated in the column marked "W", for the stream from which the duplicate sample was collected, of the site-specific monitoring schedule for the discharger's plant.

(3) Semi-annually, on a day on which samples are collected under section 10, each direct discharger shall collect a duplicate sample for each sample collected on that day under section 10 from the process subcategory and final effluent streams indicated as requiring quality control monitoring in the site-specific monitoring schedule for that discharger's plant.

(4) Each direct discharger shall analyze each duplicate sample collected under subsection (3) for the parameters indicated in the column marked "M", for the stream from which the duplicate sample was collected, of the site-specific monitoring schedule for that discharger's plant.

(5) Semi-annually, on a day on which samples are collected under section 11, each direct discharger shall collect a duplicate sample for each sample collected on that day under sections 8 and 11 from the cooling water effluent stream indicated as requiring quality control monitoring in the site-specific monitoring schedule for that discharger's plant.

(6) Each direct discharger shall analyze each duplicate sample collected under subsection (5) for a sample collected under section 8 for the parameters indicated in the column marked "W", and each duplicate sample collected under subsection (5) for a sample collected under section 11 for the parameters indicated in the column marked "M", for the stream from which the duplicate sample was collected, of the site-specific monitoring schedule for that discharger's plant.

(7) For the purposes of subsections (3) and (5), samples collected from a sampling point after the first sample is collected from that sampling point under subsection (3) or (5) shall be collected no sooner than 180 days after the previous sampling under subsection (3) or (5) from that sampling point.

(8) Once in respect of each emergency, maintenance activity or malfunction in a direct discharger's plant, on a day on which samples are collected under section 13 in respect of that event, the discharger shall collect a duplicate sample for each sample collected on that day under section 13 from the process subcategory and final effluent streams indicated as requiring quality control monitoring in the site-specific monitoring schedule for that discharger's plant.

(9) Each direct discharger shall analyze each duplicate sample collected under subsection (8) for the parameters indicated in the column marked "event oriented", for the stream from which the duplicate sample was collected, of the site-specific monitoring schedule for that discharger's plant.

(10) Once in each month, on a day on which samples are collected under subsection (1), each direct discharger shall prepare, process and return to the laboratory a travelling blank sample for each sample collected on that day under sections 6 to 8 from the process subcategory and final effluent streams indicated as requiring quality control monitoring in the site-specific monitoring schedule for that discharger's plant.

(11) Each direct discharger shall analyze each travelling blank sample prepared under subsection (10) for a sample collected under section 6 for the parameters indicated in the column marked "D", each travelling blank sample prepared under subsection (10) for a sample collected under section 7 for the parameters indicated in the column marked "TW", and each travelling blank sample prepared under subsection (10) for a sample collected under section 8 for the parameters indicated in the column marked "W", for the stream from which the sample for which the travelling blank sample was prepared was collected, of the site-specific monitoring schedule for that discharger's plant.

(12) Each direct discharger shall prepare, process and return to the laboratory a travelling blank sample for each duplicate sample collected under subsection (3), and shall analyze each travelling blank sample for the parameters indicated in the column marked "M", for the stream from which the duplicate sample was collected, of the site-specific monitoring schedule for that discharger's plant.

(13) Semi-annually, on a day on which samples are collected under subsection (5), each direct discharger shall prepare, process and return to the laboratory a travelling blank sample for each sample collected on that day under sections 8 and 11 from the cooling water effluent stream indicated as requiring quality control monitoring in the site-specific monitoring schedule for that discharger's plant.

(14) Each direct discharger shall analyze each travelling blank sample prepared under subsection (13) for a sample collected under section 8 for the parameters indicated in the column marked "W", and each travelling blank sample prepared under subsection (13) for a sample collected under section 11 for the parameters indicated in the column marked "M", for the stream from which the sample for which the travelling blank sample was prepared was collected, of the site-specific monitoring schedule for that discharger's plant.

(15) Each direct discharger shall prepare, process and return to the laboratory a travelling blank sample for each duplicate sample collected under subsection (8), and shall analyze each travelling blank sample for the parameters indicated in the column marked "event oriented", for the stream from which the duplicate sample was collected, of the site-specific monitoring schedule for that discharger's plant.

(16) Despite subsections (11), (12), (14) and (15), a direct discharger need not analyze a travelling blank sample for parameters in analytical test groups 3 and 8 as indicated in the characterization parameters schedule for that discharger's plant.

(17) Once in each month, on a day on which samples are collected under subsection (1), each direct discharger shall prepare, process and return to the laboratory a travelling spiked blank sample for each sample collected on that day under sections 6 to 8 from the process subcategory and final effluent streams indicated as requiring quality control monitoring in the site-specific monitoring schedule for that discharger's plant.

(18) Each direct discharger shall analyze each travelling spiked blank sample prepared under subsection (17) for a sample collected under section 6 for the parameters in analytical test groups 16 to 20, 23 and 26 indicated in the column marked "D", each travelling spiked blank sample prepared under subsection (17) for a sample collected under section 7 for the parameters in analytical test groups 16 to 20, 23 and 26 indicated in the column marked "TW", and each travelling spiked blank sample prepared under subsection (17) for a sample collected under section 8 for the parameters in analytical test groups 16 to 20, 23 and 26 indicated in the column marked "W", for the stream from which the sample for which the travelling blank sample was prepared was collected, of the site-specific monitoring schedule for that discharger's plant.

(19) Each direct discharger shall prepare, process and return to the laboratory a travelling spiked blank sample for each duplicate sample collected under subsection (3), and shall analyze each travelling spiked blank sample for the parameters in analytical test groups 16 to 20, 23 and 26 indicated in the column marked "M", for the stream from which the duplicate sample was collected, of the site-specific monitoring schedule for that discharger's plant.

(20) Each direct discharger shall prepare, process and return to the laboratory a travelling spiked blank sample for each duplicate sample collected under subsection (5), and shall analyze each travelling spiked blank sample for the parameters in analytical test groups 16 to 20, 23 and 26 as indicated in the characterization parameters schedule for that discharger's plant.

(21) Each direct discharger shall prepare, process and return to the laboratory a travelling spiked blank sample for each duplicate sample collected under subsection (8), and shall analyze each travelling spiked blank sample for the parameters in analytical test groups 16 to 20, 23 and 26 indicated in the column marked "event oriented", for the stream from which the duplicate sample was collected, of the site-specific monitoring schedule for that discharger's plant.

(22) Each direct discharger shall prepare each travelling spiked blank sample required to be analyzed by subsections (18) to (21) with a standard solution containing at least the parameters to be analyzed for, and shall record the concentration of each such parameter.

Toxicity Testing

18.-(1) Each direct discharger shall, if final effluent samples are collected under section 10 in that discharger's plant, collect a sample from each final effluent sampling point of that discharger once in each month on the same day as a set of samples is collected under section 10 from that sampling point, and shall perform a fish toxicity test on each such sample.

(2) If the tests performed under subsection (1) on all samples from a final effluent sampling point in three consecutive months result in mortality for no more than two out of ten fish at all effluent concentrations, a direct discharger may thereafter perform the tests required by subsection (1), on the samples from that sampling point, on 100 per cent undiluted samples only.

(3) If a test performed under subsection (2) on any sample from a final effluent sampling point results in mortality for more than two out of ten fish, subsection (2) ceases to apply and continues not to apply to samples from that sampling point, until the tests performed under subsection (1) on all samples from that sampling point in a further three consecutive months result in mortality for no more than two out of ten fish at all effluent concentrations.

(4) Each direct discharger shall, if final effluent samples are collected under section 10 in that discharger's plant, collect a sample from each final effluent sampling point of that discharger once in each month, on the same day as the sample is collected under subsection (1) from that sampling point, and shall perform a Daphnia magna acute lethality toxicity test on each such sample.

(5) Each direct discharger shall collect each sample required by subsection (4) together in the same container or set of containers with the sample collected under subsection (1) from the same sampling point.

(6) If final effluent samples are not collected under section 10 in a direct discharger's plant, that discharger shall, for each emergency, maintenance activity or malfunction in respect of which final effluent samples are collected under section 13, on a day on which a final effluent sample is collected under section 13 in respect of that event, collect a sample from each final effluent sampling point of that discharger from which samples are collected under section 13 on that day, and shall perform a fish toxicity test and a Daphnia magna acute lethality toxicity test on each such sample.

(7) Each direct discharger shall collect a sample from each cooling water sampling point of that discharger once in each quarter, on the same day as a set of samples is collected under section 11 from that sampling point, and shall perform a fish toxicity test and a Daphnia magna acute lethality toxicity test on each such sample.

Flow Measurement

19.-(1) Each direct discharger shall continuously measure and record the flow of each process subcategory effluent stream of that discharger at a location or set of locations representative of the flow at the sampling point established for that stream.

(2) Subject to subsection (3), each direct discharger shall continuously measure and record the flow of each final effluent stream of that discharger at a location or set of locations representative of the flow at the sampling point established for that stream.

(3) Where a direct discharger satisfies the Director that the continuous measurement of the flow of a final effluent stream would be unusually difficult, and where the direct discharger continuously measures the flow of each process subcategory effluent stream that contributes to that final effluent stream, the direct discharger may use the flow information from each process subcategory effluent stream that contributes to that final effluent stream to calculate the flow of that final effluent stream, and shall record the calculated flow.

(4) For the purposes of subsection (3), each direct discharger shall calculate the flow of the final effluent stream using methods and devices capable of accuracy to within plus or minus 20 per cent of the actual flow.

(5) Where the flow of a process subcategory or final effluent stream cannot be continuously measured on any operating day because of equipment malfunction and all reasonable care has been taken to avoid and correct the malfunction, the direct discharger may fulfill the continuous flow measurement requirements of subsections (1), (2) and (3) by estimating the total volume of effluent discharged on that day from that stream, and recording that estimate.

(6) Each direct discharger shall at the time of each sampling under this Regulation from a cooling water effluent stream of that discharger, measure or estimate the flow of that stream at a location or set of locations representative of the flow at the sampling point established for that stream and shall record the measured or estimated data.

(7) Each direct discharger shall measure or estimate the duration and approximate volume of every discharge of storm water, waste disposal site effluent, storage site effluent, and emergency overflow effluent in respect of which the discharger has taken a sample under this Regulation and shall record the measured or estimated data.

(8) Subsection 6(6) of the General Effluent Monitoring Regulation does not apply in respect of measurements or estimates of the volume of discharges of storm water.

(9) Subject to subsection (10), each direct discharger shall demonstrate by calibration, performed no earlier than 365 days before the filing of this Regulation and no later than thirty days before the first use of the device for the purposes of this Regulation, that each primary flow measuring device used to measure the flow of a process subcategory effluent stream for the purposes of this Regulation, meets the accuracy requirement of subsection 6(1) of the General Effluent Monitoring Regulation.

(10) Where a direct discharger demonstrates to the Director, by means of a certified report of a registered professional engineer of the Province of Ontario, that a primary flow measuring device has been designed and installed in accordance with the standards of a national or international standards setting organization, that primary flow measuring device will be deemed to have met the accuracy requirement of subsection 6(1) of the General Effluent Monitoring Regulation.

(11) Subject to subsection (12), each direct discharger shall demonstrate by calibration, performed no earlier than 365 days before the filing of this Regulation and no later than thirty days before the first use of the device for the purposes of this Regulation, that each flow measuring device used to measure the flow of a final effluent stream for the purposes of this Regulation, meets the accuracy requirement of subsection 6(3) of the General Effluent Monitoring Regulation.

(12) Where a direct discharger demonstrates to the Director, by means of a certified report of a registered professional engineer of the Province of Ontario, that a flow measurement device has been designed and installed in accordance with the standards of a national or international standards setting organization, that flow measurement device will be deemed to have met the accuracy requirement of subsection 6(3) of the General Effluent Monitoring Regulation.

Reporting

20.-(1) Each direct discharger shall, by the 8th day of August, 1989, submit an initial report to the Director in respect of that direct discharger's plant.

(2) Each direct discharger shall ensure that the plans submitted under paragraph 1 of subsection 7(1) of the General Effluent Monitoring Regulation identify by type each effluent stream named in the site-specific monitoring schedule for that discharger's plant.

(3) Each direct discharger shall notify the Director in writing of any changes in respect of the information submitted under subsections (1) and (2), within thirty days after the end of the month during which the change occurs.

(4) Each direct discharger shall notify the Director in writing of any change of name or ownership of its plant occurring after the 21st day of April, 1989, within thirty days after this Regulation comes into force or within thirty days after any such change.

(5) Each direct discharger shall, no later than thirty days after the event, notify the Director in writing of any process change that occurs after the day this Regulation comes into force and that may adversely affect the quality of the effluent in any effluent stream named in the site-specific monitoring schedule for that discharger's plant.

(6) Each direct discharger shall, no later than thirty days before the event or thirty days after this Regulation comes into force, notify the Director in writing of any redirection of or change in the type of an effluent stream named in the site-specific monitoring schedule for that discharger's plant that occurs after the day this Regulation comes into force.

(7) For the purposes of subsections (2) and (6), effluent stream types are the types mentioned in subsection 4(1).

(8) Despite subsection (6), a direct discharger need not notify the Director of any redirection of an effluent stream to an emergency overflow effluent stream.

(9) Each direct discharger shall report to the Director, on a floppy diskette in a format acceptable to the Director and by hard copy generated from that diskette and signed by the discharger, the results of all analyses performed by or on behalf of the discharger under sections 5 to 17 of this Regulation and under subsection 4(18) of the General Effluent Monitoring Regulation, including the data recorded under subsection 17(22) and all positive numerical values at or above the analytical method detection limits calculated by the laboratory performing the analysis, together with the date on which each sample was collected and the method used to collect each sample.

(10) For the purpose of subsection (9), each direct discharger shall report the results of analyses of samples collected for analysis for parameters in analytical test groups 2, 3, 4a, 4b, 5a, 5b, 6, 7, 8, 11, 14, 15, 25 or IS1 within sixty days after the last day of the week in which the sample was collected, and shall report the results of samples collected for analysis for parameters in analytical test groups 9, 10, 12, 16, 17, 19, 20, 23, 24, 26, 27, 28a, 28b or 29 within ninety days after the last day of the week in which the sample was collected.

(11) Each direct discharger shall, in accordance with subsection 7(6) of the General Effluent Monitoring Regulation, report to the Director the toxicity test information obtained under section 18, together with the date on which each sample was collected under section 18.

(12) For the purpose of subsection (11), each direct discharger shall report the toxicity test information obtained in respect of each sample collected under section 18 within sixty days after the last day of the week in which the sample was collected, on a floppy diskette in a format acceptable to the Director and by hard copy generated from that diskette and signed by the discharger.

(13) Each direct discharger shall submit to the Director documentation of any calibration or certification of accuracy required by subsections 19(9) to (12) of this Regulation and subsection 6(2) of the General Effluent Monitoring Regulation, no later than thirty days before the first use of the device for the purposes of this Regulation.

(14) Each direct discharger shall, with respect to each method, device or calculation for flow measurement or estimation to be used in meeting the requirements of this Regulation, other than methods, devices or calculations to be used to measure or estimate the volume of discharges of storm water, submit to the Director, no later than thirty days before the first use of the method, device or calculation for the purposes of this Regulation, documentation sufficient to satisfy the Director that the method, device or calculation complies with the accuracy requirements of subsection 6(6) of the General Effluent Monitoring Regulation.

(15) Each direct discharger shall, no later than the 1st day of October, 1989, submit to the Director a description of the methods, devices or calculations to be used in measuring or estimating the volume of discharges of storm water under subsection 19(7), together with an assessment of the accuracy of those methods, devices or calculations.

(16) Each direct discharger shall submit to the Director a description of any methods, devices or calculations used in measuring or estimating the volume of a discharge of emergency overflow effluent under subsection 19(7), together with an assessment of the accuracy of those methods, devices or calculations, within sixty days after each such measurement or estimation.

(17) Each direct discharger shall submit to the Director documentation of each calibration performed under subsection 6(7) of the General Effluent Monitoring Regulation, within thirty days after the calibration was performed or within thirty days after this Regulation comes into force.

(18) Each direct discharger shall report to the Director the flow measurement information required to be recorded under subsections 19(1) to (6) in respect of each process subcategory effluent stream, final effluent stream and cooling water effluent stream of that discharger and the date on which each flow was measured.

(19) Each direct discharger shall submit to the Director a description of any methods, devices or calculations used in estimating the volume of a discharge of effluent under subsection 19(5), together with an assessment of the accuracy of those methods, devices or calculations, within sixty days after each such estimation.

(20) Each direct discharger shall report to the Director the information required to be recorded under subsection 19(7), as well as the date and location of each discharge and overflow measured or estimated under subsection 19(7).

(21) Each direct discharger shall report in writing to the Director the date, approximate duration and amount of rainfall of each storm event in respect of which a sample is collected under section 12, within sixty days after each such storm event.

(22) Each direct discharger shall submit to the Director, at least thirty days before the collection of the first sample in each month under sections 5, 10 and 11, a schedule of intended sampling dates by sampling point location for all sampling to be done under sections 5, 10 and 11.

(23) Within thirty days after the end of each quarter, each direct discharger shall submit a report to the Director summarizing the quantities of chemicals added to each cooling water effluent stream of that discharger from which samples were collected under section 11 in the quarter, and stating the frequency of those additions.

(24) Each direct discharger shall keep records of all sampling required by this Regulation, including, for each sample, the date of collection, the sampling procedures used, the amount of sample dilution by preservative if dilution exceeds 1 per cent, and any incident likely to affect an analytical result.

(25) Each direct discharger shall record, for each grab sample collected under this Regulation, the time at which the sample was collected.

(26) Each direct discharger shall record the results of all maintenance and calibration performed on sampling equipment used in meeting the requirements of this Regulation.

(27) Each direct discharger shall, no later than the 1st day of December, 1990, submit a report to the Director describing the variation in daily flow, for the period beginning November 1st, 1989 and ending October 31st, 1990, of each process subcategory effluent stream from which samples are collected under this Regulation other than by means described in clauses 3(4)(a), (b) and (e) of the General Effluent Monitoring Regulation.

(28) The report referred to in subsection (27) shall include the raw data and calculation methods used to produce the report.

(29) Each direct discharger shall keep records of all analytical methods used in meeting the requirements of this Regulation.

(30) Each direct discharger shall submit a report to the Director detailing the date, duration and cause of each sampling, toxicity testing, analytical and flow measurement malfunction or problem that interferes with fulfilling the requirements of this Regulation, together with a description of any remedial action taken, within thirty days after the end of the month in which the malfunction or problem occurs.

(31) Each direct discharger shall keep all records and reports required by this Regulation to be kept or made for a period of two years following the date of the last report submitted to the Director under this section.

Commencement

21.-(1) This Regulation, except sections 5 to 18 and subsections 19(1) to (8), comes into force on the day on which it is filed.

(2) Sections 5 to 8, sections 10 to 18, and subsections 19(1) to (8) come into force on the 1st day of November, 1989.

(3) Section 9 comes into force on the 1st day of November, 1990.

Revocation

22.-(1) Sections 5 to 8, sections 10 to 18, and subsections 19(1) and (6) to (12) are revoked on the 1st day of November, 1990.

(2) Section 9 and subsections 19(2) to (5) are revoked on the 1st day of May, 1991.

LEGEND FOR SCHEDULES

ATG - Analytical Test Group

D - Daily

TW - Thrice weekly

W - Weekly

M - Monthly

N/A - Not Applicable

4AAP - 4-amino antipyrine method

SCHEDULE A - CHARACTERIZATION PARAMETERS SCHEDULE

The following list of parameters apply to: Algoma Steel
Dofasco
Stelco Hilton
Stelco Lake Erie Works

ANALYTICAL TEST GROUP #	NAME	PARAMETERS	CAS #s
2	Total cyanide	Total cyanide	57-12-5
3	Hydrogen ion (pH)	Hydrogen ion (pH)	N/A
4a	Nitrogen	Ammonia plus Ammonium	N/A
		Total Kjeldahl nitrogen	N/A
4b		Nitrate + Nitrite	N/A
5a	Organic carbon	Dissolved organic carbon (DOC)	N/A
5b		Total organic carbon (TOC) (NOTE 1)	N/A
6	Total phosphorus	Total phosphorus	7723-14-0
7	Specific conductance	Specific conductance	N/A
8	Suspended solids	Total suspended solids (TSS)	N/A
		Volatile suspended solids (VSS)	N/A
9	Total metals	Aluminum	7429-90-5
		Beryllium	7440-41-7
		Cadmium	7440-43-9
		Chromium	7440-47-3
		Cobalt	7440-48-4
		Copper	7440-50-8
		Lead	7439-92-1
		Molybdenum	7439-98-7
		Nickel	7440-02-0
		Silver	7440-22-4
		Thallium	7440-28-0
		Vanadium	7440-62-2
		Zinc	7440-66-6
10	Hydrides	Antimony	7440-36-0
		Arsenic	7440-38-2
		Selenium	7782-49-2
11	Chromium (Hexavalent)	Chromium (Hexavalent)	7440-47-3
12	Mercury	Mercury	7439-97-6

ANALYTICAL TEST GROUP #	NAME	PARAMETERS	CAS #s
14	Phenolics (4AAP)	Phenolics (4AAP)	N/A
15	Sulphide	Sulphide	N/A
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane	79-34-5
		1,1,2-Trichloroethane	79-00-5
		1,1-Dichloroethane	75-34-3
		1,1-Dichloroethylene	75-35-4
		1,2-Dichlorobenzene	95-50-1
		1,2-Dichloroethane (Ethylene dichloride)	107-06-2
		1,2-Dichloropropane	78-87-5
		1,3-Dichlorobenzene	541-73-1
		1,4-Dichlorobenzene	106-46-7
		Bromoform	75-25-2
		Bromomethane	74-83-9
		Carbon tetrachloride	56-23-5
		Chlorobenzene	108-90-7
		Chloroform	67-66-3
		Chloromethane	74-87-3
		Cis-1,3-Dichloropropylene	10061-01-5
		Dibromochloromethane	124-48-1
		Ethylene dibromide	106-93-4
		Methylene chloride	75-09-2
		Tetrachloroethylene (Perchloroethylene)	127-18-4
		Trans-1,2-Dichloroethylene	156-60-5
		Trans-1,3-Dichloropropylene	10061-02-6
		Trichloroethylene	79-01-6
		Trichlorofluoromethane	75-69-4
		Vinyl chloride (Chloroethylene)	75-01-4
17	Volatiles, Non-Halogenated	Benzene	71-43-2
		Ethylbenzene (NOTE 2)	100-41-4
		Styrene	100-42-5
		Toluene	108-88-3
		o-Xylene	95-47-6
		m-Xylene and p-Xylene	108-38-3
			& 106-42-3
19	Extractables, Base Neutral	Acenaphthene	83-32-9
		5-nitro Acenaphthene	602-87-9
		Acenaphthylene	208-96-8
		Anthracene	120-12-7
		Benz(a)anthracene	56-55-3
		Benzo(a)pyrene	50-32-8
		Benzo(b)fluoranthene	205-99-2
		Benzo(g,h,i)perylene	191-24-2

ANALYTICAL TEST GROUP #	NAME	PARAMETERS	CAS #s
19	Extractables, Base Neutral (continued)	Benzo(k)fluoranthene	207-08-9
		Camphene	79-92-5
		1-Chloronaphthalene	90-13-1
		2-Chloronaphthalene	91-58-7
		Chrysene	218-01-9
		Dibenz(a,h)anthracene	53-70-3
		Fluoranthene	206-44-0
		Fluorene	86-73-7
		Indeno(1,2,3-cd)pyrene	193-39-5
		Indole	120-72-9
		1-Methylnaphthalene	90-12-0
		2-Methylnaphthalene	91-57-6
		Naphthalene	91-20-3
		Perylene	198-55-0
		Phenanthrene	85-01-8
		Pyrene	129-00-0
		Benzyl butyl phthalate	85-68-7
		Bis(2-ethylhexyl) phthalate	117-81-7
		Di-n-butylphthalate	84-74-2
		Di-n-octyl phthalate (NOTE 3)	117-84-0
		4-Bromophenyl phenyl ether	101-55-3
		4-Chlorophenyl phenyl ether	7005-72-3
		Bis(2-chloroisopropyl)ether	108-60-1
		Bis(2-chloroethyl)ether	111-44-4
		2,4-Dinitrotoluene	121-14-2
		2,6-Dinitrotoluene	606-20-2
		Bis(2-chloroethoxy)methane	111-91-1
		Diphenylamine	122-39-4
		N-Nitrosodiphenylamine	86-30-6
		N-Nitrosodi-n-propylamine	621-64-7
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	4901-51-3
		2,3,4,6-Tetrachlorophenol	58-90-2
		2,3,5,6-Tetrachlorophenol	935-95-5
		2,3,4-Trichlorophenol	15950-66-0
		2,3,5-Trichlorophenol	933-78-8
		2,4,5-Trichlorophenol	95-95-4
		2,4,6-Trichlorophenol	88-06-2
		2,4-Dimethyl phenol	105-67-9
		2,4-Dinitrophenol	51-28-5
		2,4-Dichlorophenol	120-83-2
		2,6-Dichlorophenol	87-65-0
		4,6-Dinitro-o-cresol	534-52-1
		2-Chlorophenol	95-57-8
		4-Chloro-3-methylphenol	59-50-7
		4-Nitrophenol	100-02-7

SCHEDULE A - CHARACTERIZATION PARAMETERS SCHEDULE

ANALYTICAL TEST GROUP #	NAME	PARAMETERS	CAS #s
20	Extractables, Acid (Phenolics) (continued)	m-Cresol	108-39-4
		o-Cresol	95-48-7
		p-Cresol	106-44-5
		Pentachlorophenol	87-86-5
		Phenol	108-95-2
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene	634-66-2
		1,2,3,5-Tetrachlorobenzene	634-90-2
		1,2,4,5-Tetrachlorobenzene	95-94-3
		1,2,3-Trichlorobenzene	87-61-6
		1,2,4-Trichlorobenzene	120-82-1
		2,4,5-Trichlorotoluene	6639-30-1
		Hexachlorobenzene	118-74-1
		Hexachlorobutadiene	87-68-3
		Hexachlorocyclopentadiene	77-47-4
		Hexachloroethane	67-72-1
		Octachlorostyrene	29082-74-4
		Pentachlorobenzene	608-93-5
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6
		Octachlorodibenzo-p-dioxin	326-86-7
		Octachlorodibenzofuran	Unavailable
		Total heptachlorinated dibenzo-p-dioxins	Unavailable
		Total heptachlorinated dibenzofurans	Unavailable
		Total hexachlorinated dibenzo-p-dioxins	34465-46-8
		Total hexachlorinated dibenzofurans	Unavailable
		Total pentachlorinated dibenzo-p-dioxins	Unavailable
		Total pentachlorinated dibenzofurans	Unavailable
		Total tetrachlorinated dibenzo-p-dioxins	Unavailable
		Total tetrachlorinated dibenzofurans	Unavailable
25	Solvent Extractables	Oil and grease	
26	Fatty and Resin Acids	Abietic acid	514-10-3
		Chlorodehydroabietic acid	61996-36-7
		Dehydroabietic acid	1740-19-8
		Isopimaric acid	5835-26-7
		Levopimaric acid	79-54-9
		Neoabietic acid	471-77-2
		Oleic acid	112-80-1
		Pimaric acid	127-27-5
27	PCBs (Total)	PCBs (Total)	Unavailable

SCHEDULE A - CHARACTERIZATION PARAMETERS SCHEDULE

ANALYTICAL TEST GROUP #	NAME	PARAMETERS	CAS #s

NOTE 1: Total organic carbon is to be analyzed only if the total suspended solids concentration exceeds 15 mg/L.

NOTE 2: Follow the Sampling & Analytical Principles outlined for Analytical Test Group 17 in Schedule 2 and Part B of Schedule 3 to the General Effluent Monitoring Regulation with an Analytical Method Detection Limit of 0.6 µg/L.

NOTE 3: Follow the Sampling & Analytical Principles outlined for Analytical Test Group 19 in Schedule 2 and Part B of Schedule 3 to the General Effluent Monitoring Regulation with an Analytical Method Detection Limit of 2.0 µg/L.

SCHEDULE B - CHARACTERIZATION PARAMETERS SCHEDULES

The following list of parameters apply to: Atlas Specialty Steel
Ivaco Rolling Mills
Lake Ontario Steel Division of CO - Steel Inc.

ANALYTICAL TEST GROUP #	NAME	PARAMETERS	CAS #s
3	Hydrogen ion (pH)	Hydrogen ion (pH)	N/A
4a	Nitrogen	Ammonia plus Ammonium	N/A
		Total Kjeldahl nitrogen	N/A
4b		Nitrate + Nitrite	N/A
5a	Organic carbon	Dissolved organic carbon (DOC)	N/A
5b		Total organic carbon (TOC) (NOTE 1)	N/A
6	Total phosphorus	Total phosphorus	7723-14-0
7	Specific conductance	Specific conductance	N/A
8	Suspended solids	Total suspended solids (TSS)	N/A
		Volatile suspended solids (VSS)	N/A
9	Total metals	Aluminum	7429-90-5
		Beryllium	7440-41-7
		Cadmium	7440-43-9
		Chromium	7440-47-3
		Cobalt	7440-48-4
		Copper	7440-50-8
		Lead	7439-92-1
		Molybdenum	7439-98-7
		Nickel	7440-02-0
		Silver	7440-22-4
		Thallium	7440-28-0
		Vanadium	7440-62-2
		Zinc	7440-66-6
10	Hydrides	Antimony	7440-36-0
		Arsenic	7440-38-2
		Selenium	7782-49-2
11	Chromium (Hexavalent)	Chromium (Hexavalent)	7440-47-3
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane	79-34-5
		1,1,2-Trichloroethane	79-00-5
		1,1-Dichloroethane	75-34-3
		1,1-Dichloroethylene	75-35-4

ANALYTICAL TEST GROUP #	NAME	PARAMETERS	CAS #s
16	Volatiles, Halogenated (continued)	1,2-Dichlorobenzene	95-50-1
		1,2-Dichloroethane (Ethylene dichloride)	107-06-2
		1,2-Dichloropropane	78-87-5
		1,3-Dichlorobenzene	541-73-1
		1,4-Dichlorobenzene	106-46-7
		Bromoform	75-25-2
		Bromomethane	74-83-9
		Carbon tetrachloride	56-23-5
		Chlorobenzene	108-90-7
		Chloroform	67-66-3
		Chloromethane	74-87-3
		Cis-1,3-Dichloropropylene	10061-01-5
		Dibromochloromethane	124-48-1
		Ethylene dibromide	106-93-4
		Methylene chloride	75-09-2
		Tetrachloroethylene (Perchloroethylene)	127-18-4
		Trans-1,2-Dichloroethylene	156-60-5
		Trans-1,3-Dichloropropylene	10061-02-6
		Trichloroethylene	79-01-6
		Trichlorofluoromethane	75-69-4
		Vinyl chloride (Chloroethylene)	75-01-4
17	Volatiles, Non-Halogenated	Benzene	71-43-2
		Ethylbenzene (NOTE 2)	100-41-4
		Styrene	100-42-5
		Toluene	108-88-3
		o-Xylene	95-47-6
		m-Xylene and p-Xylene	108-38-3
			& 106-42-3
19	Extractables, Base Neutral	Acenaphthene	83-32-9
		5-nitro Acenaphthene	602-87-9
		Acenaphthylene	208-96-8
		Anthracene	120-12-7
		Benz(a)anthracene	56-55-3
		Benzo(a)pyrene	50-32-8
		Benzo(b)fluoranthene	205-99-2
		Benzo(g,h,i)perylene	191-24-2
		Benzo(k)fluoranthene	207-08-9
		Camphene	79-92-5
		1-Chloronaphthalene	90-13-1
		2-Chloronaphthalene	91-58-7
		Chrysene	218-01-9
		Dibenz(a,h)anthracene	53-70-3
		Fluoranthene	206-44-0
		Fluorene	86-73-7

ANALYTICAL TEST GROUP #	NAME	PARAMETERS	CAS #s
19	Extractables, Base Neutral (continued)	Indeno(1,2,3-cd)pyrene	193-39-5
		Indole	120-72-9
		1-Methylnaphthalene	90-12-0
		2-Methylnaphthalene	91-57-6
		Naphthalene	91-20-3
		Perylene	198-55-0
		Phenanthrene	85-01-8
		Pyrene	129-00-0
		Benzyl butyl phthalate	85-68-7
		Bis(2-ethylhexyl) phthalate	117-81-7
		Di-n-butyl phthalate	84-74-2
		Di-n-octyl phthalate (NOTE 3)	117-84-0
		4-Bromophenyl phenyl ether	101-55-3
		4-Chlorophenyl phenyl ether	7005-72-3
		Bis(2-chloroisopropyl)ether	108-60-1
		Bis(2-chloroethyl)ether	111-44-4
		2,4-Dinitrotoluene	121-14-2
		2,6-Dinitrotoluene	606-20-2
		Bis(2-chloroethoxy)methane	111-91-1
		Diphenylamine	122-39-4
		N-Nitrosodiphenylamine	86-30-6
		N-Nitrosodi-n-propylamine	621-64-7
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	4901-51-3
		2,3,4,6-Tetrachlorophenol	58-90-2
		2,3,5,6-Tetrachlorophenol	935-95-5
		2,3,4-Trichlorophenol	15950-66-0
		2,3,5-Trichlorophenol	933-78-8
		2,4,5-Trichlorophenol	95-95-4
		2,4,6-Trichlorophenol	88-06-2
		2,4-Dimethyl phenol	105-67-9
		2,4-Dinitrophenol	51-28-5
		2,4-Dichlorophenol	120-83-2
		2,6-Dichlorophenol	87-65-0
		4,6-Dinitro-o-cresol	534-52-1
		2-Chlorophenol	95-57-8
		4-Chloro-3-methylphenol	59-50-7
		4-Nitrophenol	100-02-7
		m-Cresol	108-39-4
		o-Cresol	95-48-7
		p-Cresol	106-44-5
		Pentachlorophenol	87-86-5
		Phenol	108-95-2

ANALYTICAL TEST GROUP #	NAME	PARAMETERS	CAS #s
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene	634-66-2
		1,2,3,5-Tetrachlorobenzene	634-90-2
		1,2,4,5-Tetrachlorobenzene	95-94-3
		1,2,3-Trichlorobenzene	87-61-6
		1,2,4-Trichlorobenzene	120-82-1
		2,4,5-Trichlorotoluene	6639-30-1
		Hexachlorobenzene	118-74-1
		Hexachlorobutadiene	87-68-3
		Hexachlorocyclopentadiene	77-47-4
		Hexachloroethane	67-72-1
		Octachlorostyrene	29082-74-4
		Pentachlorobenzene	608-93-5
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6
		Octachlorodibenzo-p-dioxin	326-88-7
		Octachlorodibenzofuran	Unavailable
		Total heptachlorinated dibenzo-p-dioxins	Unavailable
		Total heptachlorinated dibenzofurans	Unavailable
		Total hexachlorinated dibenzo-p-dioxins	34465-46-8
		Total hexachlorinated dibenzofurans	Unavailable
		Total pentachlorinated dibenzo-p-dioxins	Unavailable
		Total pentachlorinated dibenzofurans	Unavailable
		Total tetrachlorinated dibenzo-p-dioxins	Unavailable
		Total tetrachlorinated dibenzofurans	Unavailable
25	Solvent Extractables	Oil and grease	
27	PCBs (Total)	PCBs (Total)	Unavailable

NOTE 1: Total organic carbon is to be analyzed only if the total suspended solids concentration exceeds 15 mg/L.

NOTE 2: Follow the Sampling & Analytical Principles outlined for Analytical Test Group 17 in Schedule 2 and Part B of Schedule 3 to the General Effluent Monitoring Regulation with an Analytical Method Detection Limit of 0.6 µg/L.

NOTE 3: Follow the Sampling & Analytical Principles outlined for Analytical Test Group 19 in Schedule 2 and Part B of Schedule 3 to the General Effluent Monitoring Regulation with an Analytical Method Detection Limit of 2.0 µg/L.

SCHEDULE C - ANALYTICAL TEST GROUP NUMBERS AND PARAMETERS FOR OPEN CHARACTERIZATION

	ANALYTICAL TEST GROUP NAME	PARAMETERS	CAS #s
28a	Open Characterization - Volatiles	An extension of ATGs 16, 17	
28b	Open Characterization - Extractables	An extension of ATGs 19, 20, 23	
29	Open Characterization - Elemental	Aluminum	7429-90-5
		Antimony	7440-36-0
		Arsenic	7440-38-2
		Barium	7440-39-3
		Beryllium	7440-41-7
		Bismuth	7440-69-9
		Boron	7440-42-8
		Cadmium	7440-43-9
		Calcium	7440-70-2
		Cerium	7440-45-1
		Cesium	7440-46-2
		Chromium	7440-47-3
		Cobalt	7440-48-4
		Copper	7440-50-8
		Dysprosium	7429-91-6
		Erbium	7440-52-0
		Europium	7440-53-1
		Gadolinium	7440-54-2
		Gallium	7440-55-3
		Germanium	7440-56-4
		Gold	7440-57-5
		Hafnium	7440-58-6
		Holmium	7440-60-0
		Indium	7440-74-6
		Iridium	7439-88-5
		Iron	7439-89-6
		Lanthanum	7439-91-0
		Lead	7439-92-1
		Lithium	7439-93-2
		Lutetium	7439-94-3
		Magnesium	7439-95-4
		Manganese	7439-96-5
		Mercury	7439-97-6
		Molybdenum	7439-98-7
		Neodymium	7440-00-8
		Nickel	7440-02-0
		Niobium	7440-03-1
		Osmium	7440-04-2
		Palladium	7440-05-3
		Phosphorus	7723-14-0
		Platinum	7440-06-4
		Potassium	7440-09-7

SCHEDULE C - ANALYTICAL TEST GROUP NUMBERS AND PARAMETERS FOR OPEN CHARACTERIZATION

	ANALYTICAL TEST GROUP NAME	PARAMETERS	CAS #s
29	Open Characterization - Elemental (continued)	Praseodymium	7440-10-0
		Rhenium	7440-15-5
		Rhodium	7440-16-6
		Rubidium	7440-17-7
		Ruthenium	7440-18-8
		Samarium	7440-19-9
		Scandium	7440-20-2
		Selenium	7782-49-2
		Silicon	7440-21-3
		Silver	7440-22-4
		Sodium	7440-02-35
		Strontium	7440-24-6
		Sulfur	7704-34-9
		Tantalum	7440-25-7
		Tellurium	13494-80-9
		Terbium	7440-27-9
		Thallium	7440-28-0
		Thorium	7440-29-1
		Thulium	7440-30-4
		Tin	7440-31-5
		Titanium	7440-32-6
		Tungsten	7440-33-7
		Uranium	7440-61-1
		Vanadium	7440-62-2
		Ytterbium	7440-64-1
		Yttrium	7440-65-5
		Zinc	7440-66-6
		Zirconium	7440-67-7

SCHEDULE D - SAMPLING PRINCIPLES

Column 1 ANALYTICAL TEST GROUP	Column 2 LABORATORY SAMPLE CONTAINER	Column 3 LABORATORY CONTAINER PRE-TREATMENT	Column 4 TEST SPECIFIC SAMPLING PRECAUTIONS	Col. 5 MIN. SAM. VOL.	Column 6 PRESERVATION METHOD	Column 7 MAX. STORAGE TIME (DAYS)
Fatty and Resin Acids 26	Amber glass or fluorocarbon resin with fluorocarbon resin lined cap.	If pre-treatment necessary: Bottle: Sequence of extensive washing/hot water, detergent, water, distilled water. Bake at 300° C for 8 h minimum or 3 rinses with pesticide grade or distilled in glass hexane and dichloromethane. Cap: no pre-treatment.	Contact surfaces must be glass, fluorocarbon resin or stainless steel.	800mL	None	7
Iron IS1	Sample containers and caps/ liners must be composed only of one or more of the following materials: fluorocarbon resin, polyethylene terephthalate, glass, polystyrene, polypropylene, high or low density polyethylene. Metallic foil should not be used.	If pre-treatment necessary, soak overnight in a 5% solution of nitric acid (HNO_3), followed by several rinses in distilled water.	If sample is high (>5%) in hydrocarbons or organic solvents, use glass or fluorocarbon resin sample container only.	100mL	Add nitric acid (HNO_3) (containing <1 mg/L of all analytes) to lower pH to <2.	30

SCHEDULE E - ANALYTICAL PRINCIPLES & ANALYTICAL METHOD DETECTION LIMITS

Column 1 ANALYTICAL TEST GROUP #	Column 2 PARAMETERS CONVENTIONAL AND METAL PARAMETERS	Column 3 SAMPLE PREPARATION METHOD PRINCIPLES	Column 4 INSTRUMENTAL MEASUREMENT METHOD PRINCIPLES	Column 5 ALTERNATE INSTRUMENTAL MEASUREMENT METHOD PRINCIPLES	Column 6 ANALYTICAL METHOD DETECTION LIMITS
26	Abietic acid	pH adjusted to 9 Liquid/liquid extraction with methyl t-butyl ether Methylation	Gas Chromatography/ Flame Ionization Detection Capillary column	N/A	5.0 µg/L
	Chlorodehydroabietic acid				5.0 µg/L
	Dehydroabietic acid				5.0 µg/L
	Isopimaric acid				5.0 µg/L
	Levopimaric acid				5.0 µg/L
	Neoabietic acid				5.0 µg/L
	Oleic acid				5.0 µg/L
	Pimaric acid				5.0 µg/L
IS1	Iron	Nitric evaporation or aqua regia digestion	Atomic absorption spectrometry and/or Emission Spectrometry - Inductively Coupled Plasma (ICP) or Direct Current Argon Plasma Spectrometry (DCP)	Polarography via the method of standard addition in the presence of suitable electrolyte	0.02 mg/L

SCHEDULE 1: ALGOMA STEEL

NAME OF EFFLUENT STREAM:			By-Products Area		#2 Thickener	#1 Thickener	Tube Mill				Terminal Settling Basins			
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:			No		No	No	Yes				Yes			
CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):			No		No	No	Yes				Yes			
MONITORING REQUIRED FOR ATGs 24 and 27:			No		No	No	Yes				Yes			
OPEN CHARACTERIZATION SAMPLING REQUIRED:			No		No	No	Yes				Yes			
QUALITY CONTROL MONITORING REQUIRED:			Yes		No	No	No				Yes			
FREQUENCY OF SAMPLING:			TW	M	TW	TW	D	TW	W	M	D	TW	W	M
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED												
2	Total cyanide	Total cyanide	●●●		●●●	●●●				●●●	●●●			
3	Hydrogen ion (pH)	Hydrogen ion (pH)				●●●	●●●				●●●			
4a	Nitrogen	Ammonia plus Ammonium	●●●		●●●	●●●				●●●	●●●			
		Total Kjeldahl nitrogen												
4b		Nitrate + Nitrite												
5a	Organic carbon	Dissolved organic carbon (DOC)							●●●			●●●		
5b		Total organic carbon (TOC)												
6	Total phosphorus	Total phosphorus							●●●				●●●	
7	Specific conductance	Specific conductance					●●●				●●●			
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●		●●●	●●●	●●●				●●●			
		Volatile suspended solids (VSS)	●●●		●●●	●●●	●●●				●●●			
9	Total metals	Aluminum								●●●				●●●
		Beryllium								●●●				●●●
		Cadmium								●●●				●●●
		Chromium				●●●				●●●				●●●
		Cobalt								●●●				●●●
		Copper								●●●				●●●
		Lead				●●●		●●●						●●●

SCHEDULE 1: ALGOMA STEEL

		NAME OF EFFLUENT STREAM:	By-Products Area '		#2 Thickener	#1 Thickener	Tube Mill				Terminal Settling Basins			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No		No	No	Yes				Yes			
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No		No	No	Yes				Yes			
		MONITORING REQUIRED FOR ATGs 24 and 27:	No		No	No	Yes				Yes			
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No		No	No	Yes				Yes			
		QUALITY CONTROL MONITORING REQUIRED:	Yes		No	No	No				Yes			
		FREQUENCY OF SAMPLING:	TW	M	TW	TW	D	TW	W	M	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED												
9	Total metals (continued)	Molybdenum								●●●				●●●
		Nickel								●●●				●●●
		Silver								●●●				●●●
		Thallium								●●●				●●●
		Vanadium								●●●				●●●
		Zinc			●●●	●●●		●●●						●●●
10	Hydrides	Antimony												●●●
		Arsenic												●●●
		Selenium												●●●
12	Mercury	Mercury												●●●
14	Phenolics (4AAP)	Phenolics (4AAP)	●●●		●●●	●●●				●●●	●●●			
15	Sulphide	Sulphide									●●●			
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane								●●●				●●●
		1,1,2-Trichloroethane								●●●				●●●
		1,1-Dichloroethane								●●●				●●●
		1,1-Dichloroethylene								●●●				●●●
		1,2-Dichlorobenzene								●●●				●●●
		1,2-Dichloroethane (Ethylene dichloride)								●●●				●●●
		1,2-Dichloropropane								●●●				●●●
		1,3-Dichlorobenzene								●●●				●●●
		1,4-Dichlorobenzene								●●●				●●●
		Bromoform								●●●				●●●

SCHEDULE 1: ALGOMA STEEL

		NAME OF EFFLUENT STREAM:	By-Products Area		#2 Thickener	#1 Thickener	Tube Mill				Terminal Settling Basins			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No		No	No	Yes				Yes			
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No		No	No	Yes				Yes			
		MONITORING REQUIRED FOR ATGs 24 and 27:	No		No	No	Yes				Yes			
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No		No	No	Yes				Yes			
		QUALITY CONTROL MONITORING REQUIRED:	Yes		No	No	No				Yes			
		FREQUENCY OF SAMPLING:	TW	M	TW	TW	D	TW	W	M	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED												
16	Volatiles, Halogenated (continued)	Bromomethane								●●●				●●●
		Carbon tetrachloride								●●●				●●●
		Chlorobenzene								●●●				●●●
		Chloroform								●●●				●●●
		Chloromethane								●●●				●●●
		Cis-1,3-Dichloropropylene								●●●				●●●
		Dibromochloromethane								●●●				●●●
		Ethylene dibromide								●●●				●●●
		Methylene chloride								●●●				●●●
		Tetrachloroethylene (Perchloroethylene)								●●●				●●●
		Trans-1,2-Dichloroethylene								●●●				●●●
		Trans-1,3-Dichloropropylene								●●●				●●●
		Trichloroethylene								●●●				●●●
		Trichlorofluoromethane								●●●				●●●
		Vinyl chloride (Chloroethylene)								●●●				●●●
17	Volatiles, Non-Halogenated	Benzene	●●●											●●●
		Ethylbenzene		●●●										●●●
		Styrene		●●●										●●●
		Toluene		●●●										●●●
		o-Xylene		●●●										●●●
		m-Xylene and p-Xylene		●●●										●●●
19	Extractables, Base Neutral	Acenaphthene		●●●						●●●				●●●
		5-nitro Acenaphthene		●●●						●●●				●●●
		Acenaphthylene		●●●						●●●				●●●
		Anthracene		●●●						●●●				●●●

SCHEDULE 1: ALGOMA STEEL

		NAME OF EFFLUENT STREAM:	By-Products Area		#2 Thickener	#1 Thickener	Tube Mill				Terminal Settling Basins			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No		No	No	Yes				Yes			
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No		No	No	Yes				Yes			
		MONITORING REQUIRED FOR ATGs 24 and 27:	No		No	No	Yes				Yes			
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No		No	No	Yes				Yes			
		QUALITY CONTROL MONITORING REQUIRED:	Yes		No	No	No				Yes			
		FREQUENCY OF SAMPLING:	TW	M	TW	TW	D	TW	W	M	D	TW	W	M
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED												
19	Extractables, Base Neutral (continued)	Benz(a)anthracene		●●●						●●●				●●●
		Benzo(a)pyrene	●●●							●●●				●●●
		Benzo(b)fluoranthene		●●●						●●●				●●●
		Benzo(g,h,i)perylene		●●●						●●●				●●●
		Benzo(k)fluoranthene		●●●						●●●				●●●
		Camphene		●●●						●●●				●●●
		1-Chloronaphthalene		●●●						●●●				●●●
		2-Chloronaphthalene		●●●						●●●				●●●
		Chrysene		●●●						●●●				●●●
		Dibenz(a,h)anthracene		●●●						●●●				●●●
		Fluoranthene		●●●						●●●				●●●
		Fluorene		●●●						●●●				●●●
		Indeno(1,2,3-cd)pyrene		●●●						●●●				●●●
		Indole		●●●						●●●				●●●
		1-Methylnaphthalene		●●●						●●●				●●●
		2-Methylnaphthalene		●●●						●●●				●●●
		Naphthalene	●●●							●●●				●●●
		Perylene		●●●						●●●				●●●
		Phenanthrene		●●●						●●●				●●●
		Pyrene		●●●						●●●				●●●
		Benzyl butyl phthalate		●●●						●●●				●●●
		Bis(2-ethylhexyl) phthalate		●●●						●●●				●●●
		Di-n-butyl phthalate		●●●						●●●				●●●
		Di-n-octyl phthalate		●●●						●●●				●●●
		4-Bromophenyl phenyl ether		●●●						●●●				●●●
		4-Chlorophenyl phenyl ether		●●●						●●●				●●●
		Bis(2-chloroisopropyl)ether		●●●						●●●				●●●

SCHEDULE 1: ALGOMA STEEL

NAME OF EFFLUENT STREAM:		By-Products Area		#2 Thickener	#1 Thickener	Tube Mill				Terminal Settling Basins			
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		No		No	No	Yes				Yes			
CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):		No		No	No	Yes				Yes			
MONITORING REQUIRED FOR ATGs 24 and 27:		No		No	No	Yes				Yes			
OPEN CHARACTERIZATION SAMPLING REQUIRED:		No		No	No	Yes				Yes			
QUALITY CONTROL MONITORING REQUIRED:		Yes		No	No	No				Yes			
FREQUENCY OF SAMPLING:		TW	M	TW	TW	D	TW	W	M	D	TW	W	M
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED												
19	Extractables, Base Neutral (continued)												
	Bis(2-chloroethyl)ether		●●●						●●●				●●●
	2,4-Dinitrotoluene		●●●						●●●				●●●
	2,6-Dinitrotoluene		●●●						●●●				●●●
	Bis(2-chloroethoxy)methane		●●●						●●●				●●●
	Diphenylamine		●●●						●●●				●●●
	N-Nitrosodiphenylamine		●●●						●●●				●●●
	N-Nitrosodi-n-propylamine		●●●						●●●				●●●
20	Extractables, Acid (Phenolics)												
	2,3,4,5-Tetrachlorophenol												●●●
	2,3,4,6-Tetrachlorophenol												●●●
	2,3,5,6-Tetrachlorophenol												●●●
	2,3,4-Trichlorophenol												●●●
	2,3,5-Trichlorophenol												●●●
	2,4,5-Trichlorophenol												●●●
	2,4,6-Trichlorophenol												●●●
	2,4-Dimethyl phenol												●●●
	2,4-Dinitrophenol												●●●
	2,4-Dichlorophenol												●●●
	2,6-Dichlorophenol												●●●
	4,6-Dinitro-o-cresol												●●●
	2-Chlorophenol												●●●
	4-Chloro-3-methylphenol												●●●
	4-Nitrophenol												●●●

SCHEDULE 1: ALGOMA STEEL

		NAME OF EFFLUENT STREAM:	By-Products Area		#2 Thickener	#1 Thickener	Tube Mill				Terminal Settling Basins			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No		No	No	Yes				Yes			
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No		No	No	Yes				Yes			
		MONITORING REQUIRED FOR ATGs 24 and 27:	No		No	No	Yes				Yes			
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No		No	No	Yes				Yes			
		QUALITY CONTROL MONITORING REQUIRED:	Yes		No	No	No				Yes			
		FREQUENCY OF SAMPLING:	TW	M	TW	TW	D	TW	W	M	D	TW	W	M
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED												
20	Extractables, Acid (Phenolics) (continued)	m-Cresol												●●●
		o-Cresol												●●●
		p-Cresol												●●●
		Pentachlorophenol												●●●
		Phenol												●●●
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene								●●●				●●●
		1,2,3,5-Tetrachlorobenzene								●●●				●●●
		1,2,4,5-Tetrachlorobenzene								●●●				●●●
		1,2,3-Trichlorobenzene								●●●				●●●
		1,2,4-Trichlorobenzene								●●●				●●●
		2,4,5-Trichlorotoluene								●●●				●●●
		Hexachlorobenzene								●●●				●●●
		Hexachlorobutadiene								●●●				●●●
		Hexachlorocyclopentadiene								●●●				●●●
		Hexachloroethane								●●●				●●●
		Octachlorostyrene								●●●				●●●
		Pentachlorobenzene								●●●				●●●
25	Solvent Extractables	Oil and grease	●●●			●●●	●●●				●●●			
IS1	Iron	Iron							●●●				●●●	

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 1: ALGOMA STEEL

NAME OF EFFLUENT STREAM:		Bar & Strip Lagoon Outfall				Cold Mill 24"			Cold Mill 20"			60" Sewer Outfall			30" Sewer Outfall		
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		Yes				Yes			Yes			Yes			Yes		
CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):		Yes				Yes			Yes			Yes			Yes		
MONITORING REQUIRED FOR ATGs 24 and 27:		Yes				No			No			No			No		
OPEN CHARACTERIZATION SAMPLING REQUIRED:		Yes				No			No			No			No		
QUALITY CONTROL MONITORING REQUIRED:		No				No			No			No			Yes		
FREQUENCY OF SAMPLING:		D	TW	W	M	D	W	M	D	W	M	D	W	M	D	W	M
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED																
2	Total cyanide	Total cyanide	●●●					●●●			●●●			●●●			●●●
3	Hydrogen ion (pH)	Hydrogen ion (pH)	●●●				●●●			●●●			●●●			●●●		
4a	Nitrogen	Ammonia plus Ammonium			●●●			●●●			●●●			●●●			●●●
		Total Kjeldahl nitrogen															
4b		Nitrate + Nitrite															
5a	Organic carbon	Dissolved organic carbon (DOC)		●●●				●●●			●●●			●●●			●●●
5b		Total organic carbon (TOC)															
6	Total phosphorus	Total phosphorus			●●●			●●●			●●●			●●●			●●●
7	Specific conductance	Specific conductance	●●●														
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●				●●●			●●●			●●●			●●●		
		Volatile suspended solids (VSS)	●●●				●●●			●●●			●●●			●●●		
9	Total metals	Aluminum				●●●												
		Beryllium				●●●												
		Cadmium				●●●												
		Chromium				●●●		●●●			●●●			●●●			●●●
		Cobalt				●●●												
		Copper				●●●												
		Lead				●●●		●●●			●●●			●●●			●●●

SCHEDULE 1: ALGOMA STEEL

		NAME OF EFFLUENT STREAM:	Bar & Strip Lagoon Outfall				Cold Mill 24"			Cold Mill 20"			60" Sewer Outfall			30" Sewer Outfall		
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes			Yes			Yes			Yes		
		CHARACTERIZATION SAMPLING REQUIRED (except for AT6s 24 and 27):	Yes				Yes			Yes			Yes			Yes		
		MONITORING REQUIRED FOR AT6s 24 and 27:	Yes				No			No			No			No		
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				No			No			No			No		
		QUALITY CONTROL MONITORING REQUIRED:	No				No			No			No			Yes		
		FREQUENCY OF SAMPLING:	D	TW	W	M	D	W	M	D	W	M	D	W	M	D	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED																
9	Total metals (continued)	Molybdenum				●●●												
		Nickel				●●●												
		Silver				●●●												
		Thallium				●●●												
		Vanadium				●●●												
		Zinc	●●●						●●●			●●●			●●●			●●●
10	Hydrides	Antimony				●●●												
		Arsenic				●●●												
		Selenium				●●●												
12	Mercury	Mercury																
14	Phenolics (4AAP)	Phenolics (4AAP)	●●●						●●●			●●●			●●●			●●●
15	Sulphide	Sulphide																
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane				●●●												
		1,1,2-Trichloroethane				●●●												
		1,1-Dichloroethane				●●●												
		1,1-Dichloroethylene				●●●												
		1,2-Dichlorobenzene				●●●												
		1,2-Dichloroethane (Ethylene dichloride)				●●●												
		1,2-Dichloropropane				●●●												
		1,3-Dichlorobenzene				●●●												
		1,4-Dichlorobenzene				●●●												
		Bromoform				●●●												

SCHEDULE 1: ALGOMA STEEL

NAME OF EFFLUENT STREAM:		Bar & Strip Lagoon Outfall				Cold Mill 24"			Cold Mill 20"			60" Sewer Outfall			30" Sewer Outfall		
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		Yes				Yes			Yes			Yes			Yes		
CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):		Yes				Yes			Yes			Yes			Yes		
MONITORING REQUIRED FOR ATGs 24 and 27:		Yes				No			No			No			No		
OPEN CHARACTERIZATION SAMPLING REQUIRED:		Yes				No			No			No			No		
QUALITY CONTROL MONITORING REQUIRED:		No				No			No			No			Yes		
FREQUENCY OF SAMPLING:		D	TW	W	M	D	W	M	D	W	M	D	W	M	D	W	M
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED																
16	Volatiles, Halogenated (continued)																
	Bromomethane				●●●												
	Carbon tetrachloride				●●●												
	Chlorobenzene				●●●												
	Chloroform				●●●												
	Chloromethane				●●●												
	Cis-1,3-Dichloropropylene				●●●												
	Dibromochloromethane				●●●												
	Ethylene dibromide				●●●												
	Methylene chloride				●●●												
	Tetrachloroethylene (Perchloroethylene)				●●●												
	Trans-1,2-Dichloroethylene				●●●												
	Trans-1,3-Dichloropropylene				●●●												
	Trichloroethylene				●●●												
	Trichlorofluoromethane				●●●												
	Vinyl chloride (Chloroethylene)				●●●												
17	Volatiles, Non-Halogenated																
	Benzene				●●●												
	Ethylbenzene				●●●												
	Styrene				●●●												
	Toluene				●●●												
	o-Xylene				●●●												
	m-Xylene and p-Xylene				●●●												
19	Extractables, Base Neutral																
	Acenaphthene				●●●												
	5-nitro Acenaphthene				●●●												
	Acenaphthylene				●●●												
	Anthracene				●●●												

SCHEDULE 1: ALGOMA STEEL

	NAME OF EFFLUENT STREAM:	Bar & Strip Lagoon Outfall				Cold Mill 24"			Cold Mill 20"			60" Sewer Outfall			30" Sewer Outfall		
	FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes			Yes			Yes			Yes		
	CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	Yes				Yes			Yes			Yes			Yes		
	MONITORING REQUIRED FOR ATGs 24 and 27:	Yes				No			No			No			No		
	OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				No			No			No			No		
	QUALITY CONTROL MONITORING REQUIRED:	No				No			No			No			Yes		
	FREQUENCY OF SAMPLING:	D	TW	W	M	D	W	M	D	W	M	D	W	M	D	W	M
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED																
19	Extractables, Base Neutral (continued)																
		Benz(a)anthracene				●●●											
		Benzo(a)pyrene				●●●											
		Benzo(b)fluoranthene				●●●											
		Benzo(g,h,i)perylene				●●●											
		Benzo(k)fluoranthene				●●●											
		Camphene				●●●											
		1-Chloronaphthalene				●●●											
		2-Chloronaphthalene				●●●											
		Chrysene				●●●											
		Dibenz(a,h)anthracene				●●●											
		Fluoranthene				●●●											
		Fluorene				●●●											
		Indeno(1,2,3-cd)pyrene				●●●											
		Indole				●●●											
		1-Methylnaphthalene				●●●											
		2-Methylnaphthalene				●●●											
		Naphthalene				●●●											
		Perylene				●●●											
		Phenanthrene				●●●											
		Pyrene				●●●											
		Benzyl butyl phthalate				●●●											
		Bis(2-ethylhexyl) phthalate				●●●											
		Di-n-butyl phthalate				●●●											
		Di-n-octyl phthalate				●●●											
		4-Bromophenyl phenyl ether				●●●											
		4-Chlorophenyl phenyl ether				●●●											
		Bis(2-chloroisopropyl)ether				●●●											

SCHEDULE 1: ALGOMA STEEL

		NAME OF EFFLUENT STREAM:	Bar & Strip Lagoon Outfall				Cold Mill 24"			Cold Mill 20"			60" Sewer Outfall			30" Sewer Outfall		
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes			Yes			Yes			Yes		
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	Yes				Yes			Yes			Yes			Yes		
		MONITORING REQUIRED FOR ATGs 24 and 27:	Yes				No			No			No			No		
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				No			No			No			No		
		QUALITY CONTROL MONITORING REQUIRED:	No				No			No			No			Yes		
		FREQUENCY OF SAMPLING:	D	TW	W	M	D	W	M	D	W	M	D	W	M	D	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED																
19	Extractables, Base Neutral (continued)	Bis(2-chloroethyl)ether				●●●												
		2,4-Dinitrotoluene				●●●												
		2,6-Dinitrotoluene				●●●												
		Bis(2-chloroethoxy)methane				●●●												
		Diphenylamine				●●●												
		N-Nitrosodiphenylamine				●●●												
		N-Nitrosodi-n-propylamine				●●●												
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol				●●●												
		2,3,4,6-Tetrachlorophenol				●●●												
		2,3,5,6-Tetrachlorophenol				●●●												
		2,3,4-Trichlorophenol				●●●												
		2,3,5-Trichlorophenol				●●●												
		2,4,5-Trichlorophenol				●●●												
		2,4,6-Trichlorophenol				●●●												
		2,4-Dimethyl phenol				●●●												
		2,4-Dinitrophenol				●●●												
		2,4-Dichlorophenol				●●●												
		2,6-Dichlorophenol				●●●												
		4,6-Dinitro-o-cresol				●●●												
		2-Chlorophenol				●●●												
		4-Chloro-3-methylphenol				●●●												
		4-Nitrophenol				●●●												

SCHEDULE 1: ALGOMA STEEL

		NAME OF EFFLUENT STREAM:	Bar & Strip Lagoon Outfall				Cold Mill 24"			Cold Mill 20"			60" Sewer Outfall			30" Sewer Outfall		
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes			Yes			Yes			Yes		
		CHARACTERIZATION SAMPLING REQUIRED (except for AT6s 24 and 27):	Yes				Yes			Yes			Yes			Yes		
		MONITORING REQUIRED FOR AT6s 24 and 27:	Yes				No			No			No			No		
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				No			No			No			Yes		
		QUALITY CONTROL MONITORING REQUIRED:	No				No			No			No			No		
		FREQUENCY OF SAMPLING:	D	TW	W	M	D	W	M	D	W	M	D	W	M	D	W	M
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																
20	Extractables, Acid (Phenolics) (continued)	m-Cresol				●●●												
		o-Cresol				●●●												
		p-Cresol				●●●												
		Pentachlorophenol				●●●												
		Phenol				●●●												
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene				●●●												
		1,2,3,5-Tetrachlorobenzene				●●●												
		1,2,4,5-Tetrachlorobenzene				●●●												
		1,2,3-Trichlorobenzene				●●●												
		1,2,4-Trichlorobenzene				●●●												
		2,4,5-Trichlorotoluene				●●●												
		Hexachlorobenzene				●●●												
		Hexachlorobutadiene				●●●												
		Hexachlorocyclopentadiene				●●●												
		Hexachloroethane				●●●												
		Octachlorostyrene				●●●												
		Pentachlorobenzene				●●●												
25	Solvent Extractables	Oil and grease	●●●					●●●			●●●				●●●			●●●
IS1	Iron	Iron			●●●			●●●				●●●		●●●			●●●	

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 1: ALGOMA STEEL

NAME OF EFFLUENT STREAM:			#2 Steel Making Cooling Tower	Coke Oven Condenser	Boiler House	Cold Mill Storm Sewer Outfall
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:			Yes	Yes	Yes	No
CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):			Yes	Yes	Yes	No
MONITORING REQUIRED FOR ATGs 24 and 27:			No	No	No	No
OPEN CHARACTERIZATION SAMPLING REQUIRED:			No	No	No	No
QUALITY CONTROL MONITORING REQUIRED:			No	No	No	No
FREQUENCY OF SAMPLING:			M	M	M	M
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED				
2	Total cyanide	Total cyanide	●●●	●●●	●●●	●●●
3	Hydrogen ion (pH)	Hydrogen ion (pH)	●●●	●●●	●●●	●●●
4a	Nitrogen	Ammonia plus Ammonium	●●●	●●●	●●●	●●●
		Total Kjeldahl nitrogen				
4b		Nitrate + Nitrite				
5a	Organic carbon	Dissolved organic carbon (DOC)	●●●	●●●	●●●	
5b		Total organic carbon (TOC)				
6	Total phosphorus	Total phosphorus	●●●	●●●	●●●	
7	Specific conductance	Specific conductance				
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●	●●●	●●●	●●●
		Volatile suspended solids (VSS)	●●●	●●●	●●●	●●●
9	Total metals	Aluminum				
		Beryllium				
		Cadmium				
		Chromium	●●●	●●●	●●●	●●●
		Cobalt				
		Copper				
		Lead	●●●	●●●	●●●	●●●

SCHEDULE 1: ALGOMA STEEL

		NAME OF EFFLUENT STREAM:	#2 Steel Making Cooling Tower	Coke Oven Condenser	Boiler House	Cold Mill Storm Sewer Outfall
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes	Yes	Yes	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	Yes	Yes	Yes	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No	No	No	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No	No	No	No
		QUALITY CONTROL MONITORING REQUIRED:	No	No	No	No
		FREQUENCY OF SAMPLING:	M	M	M	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED				
9	Total metals (continued)	Molybdenum				
		Nickel				
		Silver				
		Thallium				
		Vanadium				
		Zinc	●●●	●●●	●●●	●●●
10	Hydrides	Antimony				
		Arsenic				
		Selenium				
12	Mercury	Mercury				
14	Phenolics (4AAP)	Phenolics (4AAP)	●●●	●●●	●●●	●●●
15	Sulphide	Sulphide				
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane				
		1,1,2-Trichloroethane				
		1,1-Dichloroethane				
		1,1-Dichloroethylene				
		1,2-Dichlorobenzene				
		1,2-Dichloroethane (Ethylene dichloride)				
		1,2-Dichloropropane				
		1,3-Dichlorobenzene				
		1,4-Dichlorobenzene				
		Bromoform				

SCHEDULE 1: ALGOMA STEEL

NAME OF EFFLUENT STREAM:		#2 Steel Making Cooling Tower	Coke Oven Condenser	Boiler House	Cold Mill Storm Sewer Outfall
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		Yes	Yes	Yes	No
CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):		Yes	Yes	Yes	No
MONITORING REQUIRED FOR ATGs 24 and 27:		No	No	No	No
OPEN CHARACTERIZATION SAMPLING REQUIRED:		No	No	No	No
QUALITY CONTROL MONITORING REQUIRED:		No	No	No	No
FREQUENCY OF SAMPLING:		M	M	M	M
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED				
16 Volatiles, Halogenated (continued)	Bromomethane				
	Carbon tetrachloride				
	Chlorobenzene				
	Chloroform				
	Chloromethane				
	Cis-1,3-Dichloropropylene				
	Dibromochloromethane				
	Ethylene dibromide				
	Methylene chloride				
	Tetrachloroethylene (Perchloroethylene)				
	Trans-1,2-Dichloroethylene				
	Trans-1,3-Dichloropropylene				
	Trichloroethylene				
	Trichlorofluoromethane				
	Vinyl chloride (Chloroethylene)				
17 Volatiles, Non-Halogenated	Benzene				
	Ethylbenzene				•••
	Styrene				
	Toluene				
	o-Xylene				
	m-Xylene and p-Xylene				
19 Extractables, Base Neutral	Acenaphthene				
	5-nitro Acenaphthene				
	Acenaphthylene				
	Anthracene				

SCHEDULE 1: ALGOMA STEEL

		NAME OF EFFLUENT STREAM:	#2 Steel Making Cooling Tower	Coke Oven Condenser	Boiler House	Cold Mill Storm Sewer Outfall
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes	Yes	Yes	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	Yes	Yes	Yes	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No	No	No	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No	No	No	No
		QUALITY CONTROL MONITORING REQUIRED:	No	No	No	No
		FREQUENCY OF SAMPLING:	M	M	M	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED				
19	Extractables, Base Neutral (continued)	Benz(a)anthracene				
		Benzo(a)pyrene				●●●
		Benzo(b)fluoranthene				
		Benzo(g,h,i)perylene				
		Benzo(k)fluoranthene				
		Camphene				
		1-Chloronaphthalene				
		2-Chloronaphthalene				
		Chrysene				
		Dibenz(a,h)anthracene				
		Fluoranthene				
		Fluorene				
		Indeno(1,2,3-cd)pyrene				
		Indole				
		1-Methylnaphthalene				
		2-Methylnaphthalene				
		Naphthalene				●●●
		Perylene				
		Phenanthrene				
		Pyrene				
		Benzyl butyl phthalate				
		Bis(2-ethylhexyl) phthalate				
		Di-n-butyl phthalate				
		Di-n-octyl phthalate				
		4-Bromophenyl phenyl ether				
		4-Chlorophenyl phenyl ether				
		Bis(2-chloroisopropyl)ether				

SCHEDULE 1: ALGOMA STEEL

NAME OF EFFLUENT STREAM:		#2 Steel Making Cooling Tower	Coke Oven Condenser	Boiler House	Cold Mill Storm Sewer Outfall
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		Yes	Yes	Yes	No
CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):		Yes	Yes	Yes	No
MONITORING REQUIRED FOR ATGs 24 and 27:		No	No	No	No
OPEN CHARACTERIZATION SAMPLING REQUIRED:		No	No	No	No
QUALITY CONTROL MONITORING REQUIRED:		No	No	No	No
FREQUENCY OF SAMPLING:		M	M	M	M
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED				
19 Extractables, Base Neutral (continued)	Bis(2-chloroethyl)ether				
	2,4-Dinitrotoluene				
	2,6-Dinitrotoluene				
	Bis(2-chloroethoxy)methane				
	Diphenylamine				
	N-Nitrosodiphenylamine				
	N-Nitrosodi-n-propylamine				
20 Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol				
	2,3,4,6-Tetrachlorophenol				
	2,3,5,6-Tetrachlorophenol				
	2,3,4-Trichlorophenol				
	2,3,5-Trichlorophenol				
	2,4,5-Trichlorophenol				
	2,4,6-Trichlorophenol				
	2,4-Dimethyl phenol				
	2,4-Dinitrophenol				
	2,4-Dichlorophenol				
	2,6-Dichlorophenol				
	4,6-Dinitro-o-cresol				
	2-Chlorophenol				
	4-Chloro-3-methylphenol				
	4-Nitrophenol				

SCHEDULE 1: ALGOMA STEEL

		NAME OF EFFLUENT STREAM:	#2 Steel Making Cooling Tower	Coke Oven Condenser	Boiler House	Cold Mill Storm Sewer Outfall
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes	Yes	Yes	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	Yes	Yes	Yes	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No	No	No	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No	No	No	No
		QUALITY CONTROL MONITORING REQUIRED:	No	No	No	No
		FREQUENCY OF SAMPLING:	M	M	M	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED				
20	Extractables, Acid (Phenolics) (continued)	m-Cresol				
		o-Cresol				
		p-Cresol				
		Pentachlorophenol				
		Phenol				
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene				
		1,2,3,5-Tetrachlorobenzene				
		1,2,4,5-Tetrachlorobenzene				
		1,2,3-Trichlorobenzene				
		1,2,4-Trichlorobenzene				
		2,4,5-Trichlorotoluene				
		Hexachlorobenzene				
		Hexachlorobutadiene				
		Hexachlorocyclopentadiene				
		Hexachloroethane				
		Octachlorostyrene				
		Pentachlorobenzene				
25	Solvent Extractables	Oil and grease	●●●	●●●	●●●	●●●
IS1	Iron	Iron	●●●	●●●	●●●	●●●

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 2: ATLAS SPECIALTY STEELS

		NAME OF EFFLUENT STREAM:	Waste Acid Solidification Plant	North Plant Treatment	CEVAM	42" Sewer				Waste Disposal Site
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No	No	Yes				No
		CHARACTERIZATION SAMPLING REQUIRED (except for AT6s 24 and 27):	No	No	No	Yes				No
		MONITORING REQUIRED FOR AT6s 24 and 27:	No	No	No	Yes				No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No	No	No	Yes				No
		QUALITY CONTROL MONITORING REQUIRED:	No	Yes	No	Yes				No
		FREQUENCY OF SAMPLING:	W	TW	TW	D	TW	W	M	Event Oriented
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED								
3	Hydrogen ion (pH)	Hydrogen ion (pH)	●●●	●●●	●●●	●●●				●●●
5a	Organic carbon	Dissolved organic carbon (DOC)					●●●			
5b		Total organic carbon (TOC)								
6	Total phosphorus	Total phosphorus						●●●		
7	Specific conductance	Specific conductance				●●●				
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●	●●●	●●●	●●●				●●●
		Volatile suspended solids (VSS)	●●●	●●●	●●●	●●●				●●●
9	Total metals	Aluminum	●●●						●●●	
		Beryllium	●●●						●●●	
		Cadmium	●●●						●●●	
		Chromium	●●●	●●●	●●●				●●●	
		Cobalt	●●●						●●●	
		Copper	●●●						●●●	
		Lead	●●●						●●●	
		Molybdenum	●●●						●●●	
		Nickel	●●●	●●●	●●●				●●●	●●●
		Silver	●●●						●●●	
		Thallium	●●●						●●●	
		Vanadium	●●●						●●●	
		Zinc	●●●	●●●	●●●				●●●	●●●

SCHEDULE 2: ATLAS SPECIALTY STEELS

		NAME OF EFFLUENT STREAM:	Waste Acid Solidification Plant	North Plant Treatment	CEVAM	42" Sewer				Waste Disposal Site
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No	No	Yes				No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No	No	No	Yes				No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No	No	No	Yes				No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No	No	No	Yes				No
		QUALITY CONTROL MONITORING REQUIRED:	No	Yes	No	Yes				No
		FREQUENCY OF SAMPLING:	W	TW	TW	D	TW	W	M	Event Oriented
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED								
10	Hydrides	Antimony	●●●							
		Arsenic	●●●							
		Selenium	●●●							
11	Chromium (Hexavalent)	Chromium (Hexavalent)	●●●	●●●						●●●
14	Phenolics (4AAP)	Phenolics (4AAP)								
									●●●	
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane							●●●	
		1,1,2-Trichloroethane							●●●	
		1,1-Dichloroethane							●●●	
		1,1-Dichloroethylene							●●●	
		1,2-Dichlorobenzene							●●●	
		1,2-Dichloroethane (Ethylene dichloride)							●●●	
		1,2-Dichloropropane							●●●	
		1,3-Dichlorobenzene							●●●	
		1,4-Dichlorobenzene							●●●	
		Bromoform							●●●	
		Bromomethane							●●●	
		Carbon tetrachloride							●●●	
		Chlorobenzene							●●●	
		Chloroform							●●●	
		Chloromethane							●●●	
		Cis-1,3-Dichloropropylene							●●●	
		Dibromochloromethane							●●●	
		Ethylene dibromide							●●●	
		Methylene chloride							●●●	

SCHEDULE 2: ATLAS SPECIALTY STEELS

		NAME OF EFFLUENT STREAM:	Waste Acid Solidification Plant	North Plant Treatment	CEVAM	42" Sewer				Waste Disposal Site
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No	No	Yes				No
		CHARACTERIZATION SAMPLING REQUIRED (except for AT6s 24 and 27):	No	No	No	Yes				No
		MONITORING REQUIRED FOR AT6s 24 and 27:	No	No	No	Yes				No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No	No	No	Yes				No
		QUALITY CONTROL MONITORING REQUIRED:	No	Yes	No	Yes				No
		FREQUENCY OF SAMPLING:	W	TW	TW	D	TW	W	M	Event Oriented
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED								
16	Volatiles, Halogenated (continued)	Tetrachloroethylene (Perchloroethylene)							●●●	
		Trans-1,2-Dichloroethylene							●●●	
		Trans-1,3-Dichloropropylene							●●●	
		Trichloroethylene							●●●	
		Trichlorofluoromethane							●●●	
		Vinyl chloride (Chloroethylene)							●●●	
19	Extractables, Base Neutral	Acenaphthene							●●●	
		5-nitro Acenaphthene							●●●	
		Acenaphthylene							●●●	
		Anthracene							●●●	
		Benz(a)anthracene							●●●	
		Benzo(a)pyrene							●●●	
		Benzo(b)fluoranthene							●●●	
		Benzo(g,h,i)perylene							●●●	
		Benzo(k)fluoranthene							●●●	
		Camphene							●●●	
		1-Chloronaphthalene							●●●	
		2-Chloronaphthalene							●●●	
		Chrysene							●●●	
		Dibenz(a,h)anthracene							●●●	
		Fluoranthene							●●●	
		Fluorene							●●●	
		Indeno(1,2,3-cd)pyrene							●●●	
		Indole							●●●	
		1-Methylnaphthalene							●●●	
		2-Methylnaphthalene							●●●	

SCHEDULE 2: ATLAS SPECIALTY STEELS

		NAME OF EFFLUENT STREAM:	Waste Acid Solidification Plant	North Plant Treatment	CEVAM	42" Sewer				Waste Disposal Site
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No	No	Yes				No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No	No	No	Yes				No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No	No	No	Yes				No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No	No	No	Yes				No
		QUALITY CONTROL MONITORING REQUIRED:	No	Yes	No	Yes				No
		FREQUENCY OF SAMPLING:	W	TW	TW	D	TW	W	M	Event Oriented
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED								
19	Extractables, Base Neutral (continued)	Naphthalene							●●●	
		Perylene							●●●	
		Phenanthrene							●●●	
		Pyrene							●●●	
		Benzyl butyl phthalate							●●●	
		Bis(2-ethylhexyl) phthalate							●●●	
		Di-n-butyl phthalate							●●●	
		Di-n-octyl phthalate							●●●	
		4-Bromophenyl phenyl ether							●●●	
		4-Chlorophenyl phenyl ether							●●●	
		Bis(2-chloroisopropyl)ether							●●●	
		Bis(2-chloroethyl)ether							●●●	
		2,4-Dinitrotoluene							●●●	
		2,6-Dinitrotoluene							●●●	
		Bis(2-chloroethoxy)methane							●●●	
		Diphenylamine							●●●	
		N-Nitrosodiphenylamine							●●●	
		N-Nitrosodi-n-propylamine							●●●	

SCHEDULE 2: ATLAS SPECIALTY STEELS

		NAME OF EFFLUENT STREAM:	Waste Acid Solidification Plant	North Plant Treatment	CEVAM	42" Sewer				Waste Disposal Site
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No	No	Yes				No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No	No	No	Yes				No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No	No	No	Yes				No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No	No	No	Yes				No
		QUALITY CONTROL MONITORING REQUIRED:	No	Yes	No	Yes				No
		FREQUENCY OF SAMPLING:	W	TW	TW	D	TW	W	M	Event Oriented
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED								
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene							●●●	
		1,2,3,5-Tetrachlorobenzene							●●●	
		1,2,4,5-Tetrachlorobenzene							●●●	
		1,2,3-Trichlorobenzene							●●●	
		1,2,4-Trichlorobenzene							●●●	
		2,4,5-Trichlorotoluene							●●●	
		Hexachlorobenzene							●●●	
		Hexachlorobutadiene							●●●	
		Hexachlorocyclopentadiene							●●●	
		Hexachloroethane							●●●	
		Octachlorostyrene							●●●	
		Pentachlorobenzene							●●●	
25	Solvent Extractables	Oil and grease	●●●	●●●	●●●	●●●				●●●
IS1	Iron	Iron							●●●	●●●

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 2: ATLAS SPECIALTY STEELS

		NAME OF EFFLUENT STREAM:	South Plant Water Reclaim	North Plant Water Reclaim at 42" Sewer	#3 Building
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No	No	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No	No	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No	No	No
		QUALITY CONTROL MONITORING REQUIRED:	No	No	No
		FREQUENCY OF SAMPLING:	Event Oriented	Event Oriented	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED			
3	Hydrogen ion (pH)	Hydrogen ion (pH)	●●●	●●●	●●●
5a	Organic carbon	Dissolved organic carbon (DOC)			
5b		Total organic carbon (TOC)			
6	Total phosphorus	Total phosphorus			
7	Specific conductance	Specific conductance			
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●	●●●	●●●
		Volatile suspended solids (VSS)	●●●	●●●	●●●
9	Total metals	Aluminum			
		Beryllium			
		Cadmium			
		Chromium			
		Cobalt			
		Copper			
		Lead			
		Molybdenum			
		Nickel	●●●	●●●	●●●
		Silver			
		Thallium			
		Vanadium			
		Zinc	●●●	●●●	●●●

SCHEDULE 2: ATLAS SPECIALTY STEELS

		NAME OF EFFLUENT STREAM:	South Plant Water Reclaim	North Plant Water Reclaim at 42" Sewer	#3 Building
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No	No	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No	No	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No	No	No
		QUALITY CONTROL MONITORING REQUIRED:	No	No	No
		FREQUENCY OF SAMPLING:	Event Oriented	Event Oriented	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED			
10	Hydrides	Antimony			
		Arsenic			
		Selenium			
11	Chromium (Hexavalent)	Chromium (Hexavalent)			
14	Phenolics (4AAP)	Phenolics (4AAP)			
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane			
		1,1,2-Trichloroethane			
		1,1-Dichloroethane			
		1,1-Dichloroethylene			
		1,2-Dichlorobenzene			
		1,2-Dichloroethane (Ethylene dichloride)			
		1,2-Dichloropropane			
		1,3-Dichlorobenzene			
		1,4-Dichlorobenzene			
		Bromoform			
		Bromomethane			
		Carbon tetrachloride			
		Chlorobenzene			
		Chloroform			
		Chloromethane			
		Cis-1,3-Dichloropropylene			
		Dibromochloromethane			
		Ethylene dibromide			
		Methylene chloride			

SCHEDULE 2: ATLAS SPECIALTY STEELS

		NAME OF EFFLUENT STREAM:	South Plant Water Reclaim	North Plant Water Reclaim at 42" Sewer	#3 Building
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No	No	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No	No	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No	No	No
		QUALITY CONTROL MONITORING REQUIRED:	No	No	No
		FREQUENCY OF SAMPLING:	Event Oriented	Event Oriented	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED			
16	Volatiles, Halogenated (continued)	Tetrachloroethylene (Perchloroethylene)			
		Trans-1,2-Dichloroethylene			
		Trans-1,3-Dichloropropylene			
		Trichloroethylene			
		Trichlorofluoromethane			
		Vinyl chloride (Chloroethylene)			
19	Extractables, Base Neutral	Acenaphthene			
		5-nitro Acenaphthene			
		Acenaphthylene			
		Anthracene			
		Benz(a)anthracene			
		Benzo(a)pyrene			
		Benzo(b)fluoranthene			
		Benzo(g,h,i)perylene			
		Benzo(k)fluoranthene			
		Camphene			
		1-Chloronaphthalene			
		2-Chloronaphthalene			
		Chrysene			
		Dibenz(a,h)anthracene			
		Fluoranthene			
		Fluorene			
		Indeno(1,2,3-cd)pyrene			
		Indole			
		1-Methylnaphthalene			
		2-Methylnaphthalene			

SCHEDULE 2: ATLAS SPECIALTY STEELS

		NAME OF EFFLUENT STREAM:	South Plant Water Reclaim	North Plant Water Reclaim at 42" Sewer	#3 Building
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No	No	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No	No	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No	No	No
		QUALITY CONTROL MONITORING REQUIRED:	No	No	No
		FREQUENCY OF SAMPLING:	Event Oriented	Event Oriented	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED			
19	Extractables, Base Neutral (continued)	Naphthalene			
		Perylene			
		Phenanthrene			
		Pyrene			
		Benzyl butyl phthalate			
		Bis(2-ethylhexyl) phthalate			
		Di-n-butyl phthalate			
		Di-n-octyl phthalate			
		4-Bromophenyl phenyl ether			
		4-Chlorophenyl phenyl ether			
		Bis(2-chloroisopropyl)ether			
		Bis(2-chloroethyl)ether			
		2,4-Dinitrotoluene			
		2,6-Dinitrotoluene			
		Bis(2-chloroethoxy)methane			
		Diphenylamine			
		N-Nitrosodiphenylamine			
		N-Nitrosodi-n-propylamine			

SCHEDULE 2: ATLAS SPECIALTY STEELS

		NAME OF EFFLUENT STREAM:	South Plant Water Reclaim	North Plant Water Reclaim at 42" Sewer	#3 Building
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No	No	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No	No	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No	No	No
		QUALITY CONTROL MONITORING REQUIRED:	No	No	No
		FREQUENCY OF SAMPLING:	Event Oriented	Event Oriented	M
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED			
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene			
		1,2,3,5-Tetrachlorobenzene			
		1,2,4,5-Tetrachlorobenzene			
		1,2,3-Trichlorobenzene			
		1,2,4-Trichlorobenzene			
		2,4,5-Trichlorotoluene			
		Hexachlorobenzene			
		Hexachlorobutadiene			
		Hexachlorocyclopentadiene			
		Hexachloroethane			
		Octachlorostyrene			
		Pentachlorobenzene			
25	Solvent Extractables	Oil and grease	●●●	●●●	●●●
IS1	Iron	Iron	●●●	●●●	●●●

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 3: DOFASCO

NAME OF EFFLUENT STREAM:			Coke Plant Biological Plant Discharge			Blast Furnace Recycle Blowdown	Steelmaking Clarifier Discharge
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:			No			No	No
CHARACTERIZATION SAMPLING REQUIRED (except for AT6s 24 and 27):			No			No	No
MONITORING REQUIRED FOR AT6s 24 and 27:			No			No	No
OPEN CHARACTERIZATION SAMPLING REQUIRED:			No			No	No
QUALITY CONTROL MONITORING REQUIRED:			Yes			No	No
FREQUENCY OF SAMPLING:			TW	W	M	TW	TW
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED					
2	Total cyanide	Total cyanide	●●●			●●●	
3	Hydrogen ion (pH)	Hydrogen ion (pH)					
4a	Nitrogen	Ammonia plus Ammonium	●●●			●●●	
		Total Kjeldahl nitrogen					
4b		Nitrate + Nitrite					
5a	Organic carbon	Dissolved organic carbon (DOC)					
5b		Total organic carbon (TOC)					
6	Total phosphorus	Total phosphorus		●●●			
7	Specific conductance	Specific conductance					
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●			●●●	●●●
		Volatile suspended solids (VSS)	●●●			●●●	●●●
9	Total metals	Aluminum					
		Beryllium					
		Cadmium					
		Chromium					
		Cobalt					
		Copper					
		Lead					●●●

SCHEDULE 3: DOFASCO

NAME OF EFFLUENT STREAM:			Coke Plant Biological Plant Discharge			Blast Furnace Recycle Blowdown	Steelmaking Clarifier Discharge
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:			No			No	No
CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):			No			No	No
MONITORING REQUIRED FOR ATGs 24 and 27:			No			No	No
OPEN CHARACTERIZATION SAMPLING REQUIRED:			No			No	No
QUALITY CONTROL MONITORING REQUIRED:			Yes			No	No
FREQUENCY OF SAMPLING:			TW	W	M	TW	TW
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED					
9	Total metals (continued)	Molybdenum					
		Nickel					
		Silver					
		Thallium					
		Vanadium					
		Zinc				●●●	●●●
10	Hydrides	Antimony					
		Arsenic					
		Selenium					
12	Mercury	Mercury					
14	Phenolics (4AAP)	Phenolics (4AAP)	●●●			●●●	
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane					
		1,1,2-Trichloroethane					
		1,1-Dichloroethane					
		1,1-Dichloroethylene					
		1,2-Dichlorobenzene					
		1,2-Dichloroethane (Ethylene dichloride)					
		1,2-Dichloropropane					
		1,3-Dichlorobenzene					
		1,4-Dichlorobenzene					
		Bromoform					
		Bromomethane					
		Carbon tetrachloride					

SCHEDULE 3: DOFASCO

		NAME OF EFFLUENT STREAM:	Coke Plant Biological Plant Discharge			Blast Furnace Recycle Blowdown	Steelmaking Clarifier Discharge
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No			No	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No			No	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No			No	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No			No	No
		QUALITY CONTROL MONITORING REQUIRED:	Yes			No	No
		FREQUENCY OF SAMPLING:	TW	W	M	TW	TW
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED					
16	Volatiles, Halogenated (continued)	Chlorobenzene					
		Chloroform					
		Chloromethane					
		Cis-1,3-Dichloropropylene					
		Dibromochloromethane					
		Ethylene dibromide					
		Methylene chloride					
		Tetrachloroethylene (Perchloroethylene)					
		Trans-1,2-Dichloroethylene					
		Trans-1,3-Dichloropropylene					
		Trichloroethylene					
		Trichlorofluoromethane					
		Vinyl chloride (Chloroethylene)					
17	Volatiles, Non-Halogenated	Benzene	●●●				
		Ethylbenzene			●●●		
		Styrene			●●●		
		Toluene			●●●		
		o-Xylene			●●●		
		m-Xylene and p-Xylene			●●●		
19	Extractables, Base Neutral	Acenaphthene			●●●		
		5-nitro Acenaphthene			●●●		
		Acenaphthylene			●●●		
		Anthracene			●●●		
		Benz(a)anthracene			●●●		
		Benzo(a)pyrene	●●●				

SCHEDULE 3: DOFASCO

NAME OF EFFLUENT STREAM:		Coke Plant Biological Plant Discharge			Blast Furnace Recycle Blowdown	Steelmaking Clarifier Discharge
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		No			No	No
CHARACTERIZATION SAMPLING REQUIRED (except for AT6s 24 and 27):		No			No	No
MONITORING REQUIRED FOR AT6s 24 and 27:		No			No	No
OPEN CHARACTERIZATION SAMPLING REQUIRED:		No			No	No
QUALITY CONTROL MONITORING REQUIRED:		Yes			No	No
FREQUENCY OF SAMPLING:		TW	W	M	TW	TW
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED					
19 Extractables, Base Neutral (continued)	Benzo(b)fluoranthene			●●●		
	Benzo(g,h,i)perylene			●●●		
	Benzo(k)fluoranthene			●●●		
	Camphene			●●●		
	1-Chloronaphthalene			●●●		
	2-Chloronaphthalene			●●●		
	Chrysene			●●●		
	Dibenz(a,h)anthracene			●●●		
	Fluoranthene			●●●		
	Fluorene			●●●		
	Indeno(1,2,3-cd)pyrene			●●●		
	Indole			●●●		
	1-Methylnaphthalene			●●●		
	2-Methylnaphthalene			●●●		
	Naphthalene	●●●				
	Perylene			●●●		
	Phenanthrene			●●●		
	Pyrene			●●●		
	Benzyl butyl phthalate			●●●		
	Bis(2-ethylhexyl) phthalate			●●●		
	Di-n-butyl phthalate			●●●		
	Di-n-octyl phthalate			●●●		
	4-Bromophenyl phenyl ether			●●●		
	4-Chlorophenyl phenyl ether			●●●		
	Bis(2-chloroisopropyl)ether			●●●		
	Bis(2-chloroethyl)ether			●●●		
	2,4-Dinitrotoluene			●●●		

SCHEDULE 3: DOFASCO

		NAME OF EFFLUENT STREAM:	Coke Plant Biological Plant Discharge			Blast Furnace Recycle Blowdown	Steelmaking Clarifier Discharge
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No			No	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No			No	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No			No	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No			No	No
		QUALITY CONTROL MONITORING REQUIRED:	Yes			No	No
		FREQUENCY OF SAMPLING:	TW	W	M	TW	TW
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED					
19	Extractables, Base Neutral (continued)	2,6-Dinitrotoluene			•••		
		Bis(2-chloroethoxy)methane			•••		
		Diphenylamine			•••		
		N-Nitrosodiphenylamine			•••		
		N-Nitrosodi-n-propylamine			•••		
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol					
		2,3,4,6-Tetrachlorophenol					
		2,3,5,6-Tetrachlorophenol					
		2,3,4-Trichlorophenol					
		2,3,5-Trichlorophenol					
		2,4,5-Trichlorophenol					
		2,4,6-Trichlorophenol					
		2,4-Dimethyl phenol					
		2,4-Dinitrophenol					
		2,4-Dichlorophenol					
		2,6-Dichlorophenol					
		4,6-Dinitro-o-cresol					
		2-Chlorophenol					
		4-Chloro-3-methylphenol					
		4-Nitrophenol					
		m-Cresol					
		o-Cresol					
		p-Cresol					
		Pentachlorophenol					
		Phenol					

SCHEDULE 3: DOFASCO

NAME OF EFFLUENT STREAM:			Coke Plant Biological Plant Discharge			Blast Furnace Recycle Blowdown	Steelmaking Clarifier Discharge
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:			No			No	No
CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):			No			No	No
MONITORING REQUIRED FOR ATGs 24 and 27:			No			No	No
OPEN CHARACTERIZATION SAMPLING REQUIRED:			No			No	No
QUALITY CONTROL MONITORING REQUIRED:			Yes			No	No
FREQUENCY OF SAMPLING:			TW	W	M	TW	TW
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED					
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene					
		1,2,3,5-Tetrachlorobenzene					
		1,2,4,5-Tetrachlorobenzene					
		1,2,3-Trichlorobenzene					
		1,2,4-Trichlorobenzene					
		2,4,5-Trichlorotoluene					
		Hexachlorobenzene					
		Hexachlorobutadiene					
		Hexachlorocyclopentadiene					
		Hexachloroethane					
		Octachlorostyrene					
		Pentachlorobenzene					
25	Solvent Extractables	Oil and grease	●●●				●●●
IS1	Iron	Iron					

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 3: DOFASCO

		NAME OF EFFLUENT STREAM:	#1 Hot Mill Filtration Plant Discharge	Cold Mill Treatment Plant Discharge	Ottawa Street Sewer				West Bayfront Sewer			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No	Yes				Yes			
		CHARACTERIZATION SAMPLING REQUIRED (except for AT6s 24 and 27):	No	No	Yes				Yes			
		MONITORING REQUIRED FOR AT6s 24 and 27:	No	No	Yes				Yes			
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No	No	Yes				Yes			
		QUALITY CONTROL MONITORING REQUIRED:	No	No	No				Yes			
		FREQUENCY OF SAMPLING:	TW	TW	D	TW	W	M	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
2	Total cyanide	Total cyanide					●●●				●●●	
3	Hydrogen ion (pH)	Hydrogen ion (pH)	●●●	●●●	●●●				●●●			
4a	Nitrogen	Ammonia plus Ammonium					●●●				●●●	
		Total Kjeldahl nitrogen										
4b		Nitrate + Nitrite										
5a	Organic carbon	Dissolved organic carbon (DOC)		●●●		●●●				●●●		
5b		Total organic carbon (TOC)										
6	Total phosphorus	Total phosphorus					●●●				●●●	
7	Specific conductance	Specific conductance			●●●				●●●			
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●	●●●	●●●				●●●			
		Volatile suspended solids (VSS)	●●●	●●●	●●●				●●●			
9	Total metals	Aluminum						●●●				●●●
		Beryllium						●●●				●●●
		Cadmium						●●●				●●●
		Chromium		●●●			●●●				●●●	
		Cobalt						●●●				●●●
		Copper						●●●				●●●
		Lead	●●●	●●●				●●●				●●●

SCHEDULE 3: DOFASCO

		NAME OF EFFLUENT STREAM:	#1 Hot Mill Filtration Plant Discharge	Cold Mill Treatment Plant Discharge	Ottawa Street Sewer				West Bayfront Sewer			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No	Yes				Yes			
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No	No	Yes				Yes			
		MONITORING REQUIRED FOR ATGs 24 and 27:	No	No	Yes				Yes			
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No	No	Yes				Yes			
		QUALITY CONTROL MONITORING REQUIRED:	No	No	No				Yes			
		FREQUENCY OF SAMPLING:	TW	TW	D	TW	W	M	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
9	Total metals (continued)	Molybdenum						●●●				●●●
		Nickel						●●●				●●●
		Silver						●●●				●●●
		Thallium						●●●				●●●
		Vanadium						●●●				●●●
		Zinc	●●●	●●●			●●●				●●●	
10	Hydrides	Antimony										●●●
		Arsenic										●●●
		Selenium										●●●
12	Mercury	Mercury										●●●
14	Phenolics (4AAP)	Phenolics (4AAP)					●●●				●●●	
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane						●●●				●●●
		1,1,2-Trichloroethane						●●●				●●●
		1,1-Dichloroethane						●●●				●●●
		1,1-Dichloroethylene						●●●				●●●
		1,2-Dichlorobenzene						●●●				●●●
		1,2-Dichloroethane (Ethylene dichloride)						●●●				●●●
		1,2-Dichloropropane						●●●				●●●
		1,3-Dichlorobenzene						●●●				●●●
		1,4-Dichlorobenzene						●●●				●●●
		Bromoform						●●●				●●●
		Bromomethane						●●●				●●●
		Carbon tetrachloride						●●●				●●●

SCHEDULE 3: DOFASCO

NAME OF EFFLUENT STREAM:		#1 Hot Mill Filtration Plant Discharge	Cold Mill Treatment Plant Discharge	Ottawa Street Sewer				West Bayfront Sewer			
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		No	No	Yes				Yes			
CHARACTERIZATION SAMPLING REQUIRED (except for AT6s 24 and 27):		No	No	Yes				Yes			
MONITORING REQUIRED FOR AT6s 24 and 27:		No	No	Yes				Yes			
OPEN CHARACTERIZATION SAMPLING REQUIRED:		No	No	Yes				Yes			
QUALITY CONTROL MONITORING REQUIRED:		No	No	No				Yes			
FREQUENCY OF SAMPLING:		TW	TW	D	TW	W	M	D	TW	W	M
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
16	Volatiles, Halogenated (continued)	Chlorobenzene					●●●				●●●
		Chloroform					●●●				●●●
		Chloromethane					●●●				●●●
		Cis-1,3-Dichloropropylene					●●●				●●●
		Dibromochloromethane					●●●				●●●
		Ethylene dibromide					●●●				●●●
		Methylene chloride					●●●				●●●
		Tetrachloroethylene (Perchloroethylene)					●●●				●●●
		Trans-1,2-Dichloroethylene					●●●				●●●
		Trans-1,3-Dichloropropylene					●●●				●●●
		Trichloroethylene					●●●				●●●
		Trichlorofluoromethane					●●●				●●●
		Vinyl chloride (Chloroethylene)					●●●				
17	Volatiles, Non-Halogenated	Benzene									●●●
		Ethylbenzene									●●●
		Styrene									●●●
		Toluene									●●●
		o-Xylene									●●●
		m-Xylene and p-Xylene									
19	Extractables, Base Neutral	Acenaphthene					●●●				●●●
		5-nitro Acenaphthene					●●●				●●●
		Acenaphthylene					●●●				●●●
		Anthracene					●●●				●●●
		Benz(a)anthracene					●●●				●●●
		Benzo(a)pyrene					●●●				●●●

SCHEDULE 3: DOFASCO

		NAME OF EFFLUENT STREAM:	#1 Hot Mill Filtration Plant Discharge	Cold Mill Treatment Plant Discharge	Ottawa Street Sewer				West Bayfront Sewer			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No	Yes				Yes			
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No	No	Yes				Yes			
		MONITORING REQUIRED FOR ATGs 24 and 27:	No	No	Yes				Yes			
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No	No	Yes				Yes			
		QUALITY CONTROL MONITORING REQUIRED:	No	No	No				Yes			
		FREQUENCY OF SAMPLING:	TW	TW	D	TW	W	M	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
19	Extractables, Base Neutral (continued)	Benzo(b)fluoranthene						●●●				●●●
		Benzo(g,h,i)perylene						●●●				●●●
		Benzo(k)fluoranthene						●●●				●●●
		Camphene						●●●				●●●
		1-Chloronaphthalene						●●●				●●●
		2-Chloronaphthalene						●●●				●●●
		Chrysene						●●●				●●●
		Dibenz(a,h)anthracene						●●●				●●●
		Fluoranthene						●●●				●●●
		Fluorene						●●●				●●●
		Indeno(1,2,3-cd)pyrene						●●●				●●●
		Indole						●●●				●●●
		1-Methylnaphthalene						●●●				●●●
		2-Methylnaphthalene						●●●				●●●
		Naphthalene						●●●				●●●
		Perylene						●●●				●●●
		Phenanthrene						●●●				●●●
		Pyrene						●●●				●●●
		Benzyl butyl phthalate						●●●				●●●
		Bis(2-ethylhexyl) phthalate						●●●				●●●
		Di-n-butyl phthalate						●●●				●●●
		Di-n-octyl phthalate						●●●				●●●
		4-Bromophenyl phenyl ether						●●●				●●●
		4-Chlorophenyl phenyl ether						●●●				●●●
		Bis(2-chloroisopropyl)ether						●●●				●●●
		Bis(2-chloroethyl)ether						●●●				●●●
		2,4-Dinitrotoluene						●●●				●●●

SCHEDULE 3: DOFASCO

		NAME OF EFFLUENT STREAM:	#1 Hot Mill Filtration Plant Discharge	Cold Mill Treatment Plant Discharge	Ottawa Street Sewer				West Bayfront Sewer			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No	Yes				Yes			
		CHARACTERIZATION SAMPLING REQUIRED (except for AT6s 24 and 27):	No	No	Yes				Yes			
		MONITORING REQUIRED FOR AT6s 24 and 27:	No	No	Yes				Yes			
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No	No	Yes				Yes			
		QUALITY CONTROL MONITORING REQUIRED:	No	No	No				Yes			
		FREQUENCY OF SAMPLING:	TW	TW	D	TW	W	M	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
19	Extractables, Base Neutral (continued)	2,6-Dinitrotoluene						●●●				●●●
		Bis(2-chloroethoxy)methane						●●●				●●●
		Diphenylamine						●●●				●●●
		N-Nitrosodiphenylamine						●●●				●●●
		N-Nitrosodi-n-propylamine						●●●				●●●
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol										●●●
		2,3,4,6-Tetrachlorophenol										●●●
		2,3,5,6-Tetrachlorophenol										●●●
		2,3,4-Trichlorophenol										●●●
		2,3,5-Trichlorophenol										●●●
		2,4,5-Trichlorophenol										●●●
		2,4,6-Trichlorophenol										●●●
		2,4-Dimethyl phenol										●●●
		2,4-Dinitrophenol										●●●
		2,4-Dichlorophenol										●●●
		2,6-Dichlorophenol										●●●
		4,6-Dinitro-o-cresol										●●●
		2-Chlorophenol										●●●
		4-Chloro-3-methylphenol										●●●
		4-Nitrophenol										●●●
		m-Cresol										●●●
		o-Cresol										●●●
		p-Cresol										●●●
		Pentachlorophenol										●●●
		Phenol										●●●

SCHEDULE 3: DOFASCO

		NAME OF EFFLUENT STREAM:	Hot Mill Filtration Plant Discharge	Cold Mill Treatment Plant Discharge	Ottawa Street Sewer				West Bayfront Sewer			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No	Yes				Yes			
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No	No	Yes				Yes			
		MONITORING REQUIRED FOR ATGs 24 and 27:	No	No	Yes				Yes			
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No	No	Yes				Yes			
		QUALITY CONTROL MONITORING REQUIRED:	No	No	No				Yes			
		FREQUENCY OF SAMPLING:	TW	TW	D	TW	W	M	D	TW	W	M
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED										
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene						●●●				●●●
		1,2,3,5-Tetrachlorobenzene						●●●				●●●
		1,2,4,5-Tetrachlorobenzene						●●●				●●●
		1,2,3-Trichlorobenzene						●●●				●●●
		1,2,4-Trichlorobenzene						●●●				●●●
		2,4,5-Trichlorotoluene						●●●				●●●
		Hexachlorobenzene						●●●				●●●
		Hexachlorobutadiene						●●●				●●●
		Hexachlorocyclopentadiene						●●●				●●●
		Hexachloroethane						●●●				●●●
		Octachlorostyrene						●●●				●●●
		Pentachlorobenzene										
25	Solvent Extractables	Oil and grease	●●●	●●●	●●●				●●●			
IS1	Iron	Iron					●●●				●●●	

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 3: DOFASCO

		NAME OF EFFLUENT STREAM:	East Boat Slip Sewer				Boilerhouse Sewer #1		Boilerhouse Sewer #2	Southeast Coal Fields Storm Sewer	Kenilworth Plant Storm Sewer
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes		Yes	No	No
		CHARACTERIZATION SAMPLING REQUIRED (except for AT6s 24 and 27):	Yes				Yes		Yes	No	No
		MONITORING REQUIRED FOR AT6s 24 and 27:	Yes				No		No	No	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				No		No	No	No
		QUALITY CONTROL MONITORING REQUIRED:	No				Yes		No	No	No
		FREQUENCY OF SAMPLING:	D	TW	W	M	W	M	M	Event Oriented	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED									
2	Total cyanide	Total cyanide			●●●		●●●		●●●	●●●	●●●
3	Hydrogen ion (pH)	Hydrogen ion (pH)	●●●				●●●		●●●	●●●	●●●
4a	Nitrogen	Ammonia plus Ammonium			●●●		●●●		●●●	●●●	●●●
		Total Kjeldahl nitrogen									
4b		Nitrate + Nitrite									
5a	Organic carbon	Dissolved organic carbon (DOC)		●●●				●●●	●●●		
5b		Total organic carbon (TOC)									
6	Total phosphorus	Total phosphorus			●●●		●●●		●●●		
7	Specific conductance	Specific conductance	●●●								
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●				●●●		●●●	●●●	●●●
		Volatile suspended solids (VSS)	●●●				●●●		●●●	●●●	●●●
9	Total metals	Aluminum				●●●					
		Beryllium				●●●					
		Cadmium				●●●					
		Chromium			●●●		●●●		●●●	●●●	●●●
		Cobalt				●●●					
		Copper				●●●					
		Lead				●●●		●●●	●●●	●●●	●●●

SCHEDULE 3: DOFASCO

		NAME OF EFFLUENT STREAM:	East Boat Slip Sewer				Boilerhouse Sewer #1		Boilerhouse Sewer #2	Southeast Coal Fields Storm Sewer	Kenilworth Plant Storm Sewer
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes		Yes	No	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	Yes				Yes		Yes	No	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	Yes				No		No	No	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				No		No	No	No
		QUALITY CONTROL MONITORING REQUIRED:	No				Yes		No	No	No
		FREQUENCY OF SAMPLING:	D	TW	W	M	W	M	M	Event Oriented	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED									
9	Total metals (continued)	Molybdenum				●●●					
		Nickel				●●●					
		Silver				●●●					
		Thallium				●●●					
		Vanadium				●●●					
		Zinc			●●●		●●●		●●●	●●●	●●●
10	Hydrides	Antimony				●●●					
		Arsenic				●●●					
		Selenium				●●●					
12	Mercury	Mercury				●●●					
14	Phenolics (4AAP)	Phenolics (4AAP)			●●●		●●●		●●●	●●●	●●●
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane				●●●					
		1,1,2-Trichloroethane				●●●					
		1,1-Dichloroethane				●●●					
		1,1-Dichloroethylene				●●●					
		1,2-Dichlorobenzene				●●●					
		1,2-Dichloroethane (Ethylene dichloride)				●●●					
		1,2-Dichloropropane				●●●					
		1,3-Dichlorobenzene				●●●					
		1,4-Dichlorobenzene				●●●					
		Bromoform				●●●					
		Bromomethane				●●●					
		Carbon tetrachloride				●●●					

SCHEDULE 3: DOFASCO

		NAME OF EFFLUENT STREAM:	East Boat Slip Sewer				Boilerhouse Sewer #1		Boilerhouse Sewer #2	Southeast Coal Fields Storm Sewer	Kenilworth Plant Storm Sewer
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes		Yes	No	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	Yes				Yes		Yes	No	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	Yes				No		No	No	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				No		No	No	No
		QUALITY CONTROL MONITORING REQUIRED:	No				Yes		No	No	No
		FREQUENCY OF SAMPLING:	D	TW	W	M	W	M	M	Event Oriented	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED									
16	Volatiles, Halogenated (continued)	Chlorobenzene				●●●					
		Chloroform				●●●					
		Chloromethane				●●●					
		Cis-1,3-Dichloropropylene				●●●					
		Dibromochloromethane				●●●					
		Ethylene dibromide				●●●					
		Methylene chloride				●●●					
		Tetrachloroethylene (Perchloroethylene)				●●●					
		Trans-1,2-Dichloroethylene				●●●					
		Trans-1,3-Dichloropropylene				●●●					
		Trichloroethylene				●●●					
		Trichlorofluoromethane				●●●					
		Vinyl chloride (Chloroethylene)				●●●				●●●	●●●
17	Volatiles, Non-Halogenated	Benzene				●●●					
		Ethylbenzene				●●●					
		Styrene				●●●					
		Toluene				●●●					
		o-Xylene				●●●					
		m-Xylene and p-Xylene				●●●					
19	Extractables, Base Neutral	Acenaphthene				●●●					
		5-nitro Acenaphthene				●●●					
		Acenaphthylene				●●●					
		Anthracene				●●●					
		Benz(a)anthracene				●●●				●●●	●●●
		Benzo(a)pyrene				●●●					

SCHEDULE 3: DOFASCO

NAME OF EFFLUENT STREAM:		East Boat Slip Sewer				Boilerhouse Sewer #1		Boilerhouse Sewer #2	Southeast Coal Fields Storm Sewer	Kenilworth Plant Storm Sewer
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		Yes				Yes		Yes	No	No
CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):		Yes				Yes		Yes	No	No
MONITORING REQUIRED FOR ATGs 24 and 27:		Yes				No		No	No	No
OPEN CHARACTERIZATION SAMPLING REQUIRED:		Yes				No		No	No	No
QUALITY CONTROL MONITORING REQUIRED:		No				Yes		No	No	No
FREQUENCY OF SAMPLING:		D	TW	W	M	W	M	M	Event Oriented	[illegible]
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED									
19 Extractables, Base Neutral (continued)	Benzo(b)fluoranthene				●●●					
	Benzo(g,h,i)perylene				●●●					
	Benzo(k)fluoranthene				●●●					
	Camphene				●●●					
	1-Chloronaphthalene				●●●					
	2-Chloronaphthalene				●●●					
	Chrysene				●●●					
	Dibenz(a,h)anthracene				●●●					
	Fluoranthene				●●●					
	Fluorene				●●●					
	Indeno(1,2,3-cd)pyrene				●●●					
	Indole				●●●					
	1-Methylnaphthalene				●●●					
	2-Methylnaphthalene				●●●					
	Naphthalene				●●●				●●●	●●●
	Perylene				●●●					
	Phenanthrene				●●●					
	Pyrene				●●●					
	Benzyl butyl phthalate				●●●					
	Bis(2-ethylhexyl) phthalate				●●●					
	Di-n-butyl phthalate				●●●					
	Di-n-octyl phthalate				●●●					
	4-Bromophenyl phenyl ether				●●●					
	4-Chlorophenyl phenyl ether				●●●					
	Bis(2-chloroisopropyl)ether				●●●					
	Bis(2-chloroethyl)ether				●●●					
	2,4-Dinitrotoluene				●●●					

SCHEDULE 3: DOFASCO

		NAME OF EFFLUENT STREAM:	East Boat Slip Sewer				Boilerhouse Sewer #1		Boilerhouse Sewer #2	Southeast Coal Fields Storm Sewer	Kenilworth Plant Storm Sewer
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes		Yes	No	No
		CHARACTERIZATION SAMPLING REQUIRED (except for AT6s 24 and 27):	Yes				Yes		Yes	No	No
		MONITORING REQUIRED FOR AT6s 24 and 27:	Yes				No		No	No	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				No		No	No	No
		QUALITY CONTROL MONITORING REQUIRED:	No				Yes		No	No	No
		FREQUENCY OF SAMPLING:	D	TW	W	M	W	M	M	Event Oriented	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED									
19	Extractables, Base Neutral (continued)	2,6-Dinitrotoluene				●●●					
		Bis(2-chloroethoxy)methane				●●●					
		Diphenylamine				●●●					
		N-Nitrosodiphenylamine				●●●					
		N-Nitrosodi-n-propylamine				●●●					
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol				●●●					
		2,3,4,6-Tetrachlorophenol				●●●					
		2,3,5,6-Tetrachlorophenol				●●●					
		2,3,4-Trichlorophenol				●●●					
		2,3,5-Trichlorophenol				●●●					
		2,4,5-Trichlorophenol				●●●					
		2,4,6-Trichlorophenol				●●●					
		2,4-Dimethyl phenol				●●●					
		2,4-Dinitrophenol				●●●					
		2,4-Dichlorophenol				●●●					
		2,6-Dichlorophenol				●●●					
		4,6-Dinitro-o-cresol				●●●					
		2-Chlorophenol				●●●					
		4-Chloro-3-methylphenol				●●●					
		4-Nitrophenol				●●●					
		m-Cresol				●●●					
		o-Cresol				●●●					
		p-Cresol				●●●					
		Pentachlorophenol				●●●					
		Phenol				●●●					

SCHEDULE 3: DOFASCO

		NAME OF EFFLUENT STREAM:	East Boat Slip Sewer				Boilerhouse Sewer #1		Boilerhouse Sewer #2	Southeast Coal Fields Storm Sewer	Kenilworth Plant Storm Sewer
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes		Yes	No	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	Yes				Yes		Yes	No	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	Yes				No		No	No	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				No		No	No	No
		QUALITY CONTROL MONITORING REQUIRED:	No				Yes		No	No	No
		FREQUENCY OF SAMPLING:	D	TW	W	M	W	M	M	Event Oriented	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED									
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene				●●●					
		1,2,3,5-Tetrachlorobenzene				●●●					
		1,2,4,5-Tetrachlorobenzene				●●●					
		1,2,3-Trichlorobenzene				●●●					
		1,2,4-Trichlorobenzene				●●●					
		2,4,5-Trichlorotoluene				●●●					
		Hexachlorobenzene				●●●					
		Hexachlorobutadiene				●●●					
		Hexachlorocyclopentadiene				●●●					
		Hexachloroethane				●●●					
		Octachlorostyrene				●●●					
		Pentachlorobenzene				●●●					
25	Solvent Extractables	Oil and grease	●●●				●●●		●●●	●●●	●●●
IS1	Iron	Iron			●●●		●●●		●●●	●●●	●●●

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 4: IVACO ROLLING MILLS

NAME OF EFFLUENT STREAM:		East Discharge	North-East Discharge	South-East Discharge	Mill Pond Outlet	East Discharge
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		Yes	No	No	No	Yes
CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):		Yes	No	No	No	No
MONITORING REQUIRED FOR ATGs 24 and 27:		No	No	No	No	Yes
OPEN CHARACTERIZATION SAMPLING REQUIRED:		No	No	No	No	Yes
QUALITY CONTROL MONITORING REQUIRED:		Yes	No	No	Yes	Yes
FREQUENCY OF SAMPLING:		M	M	M	Event Oriented	Event Oriented
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED					
3 Hydrogen ion (pH)	Hydrogen ion (pH)	●●●	●●●	●●●	●●●	●●●
5a Organic carbon	Dissolved organic carbon (DOC)	●●●				
5b	Total organic carbon (TOC)					
6 Total phosphorus	Total phosphorus	●●●				●●●
7 Specific conductance	Specific conductance					
8 Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●	●●●	●●●	●●●	●●●
	Volatile suspended solids (VSS)	●●●	●●●	●●●	●●●	●●●
9 Total metals	Aluminum					
	Beryllium					
	Cadmium					
	Chromium	●●●				
	Cobalt					
	Copper					
	Lead	●●●	●●●	●●●	●●●	●●●
	Molybdenum					
	Nickel					
	Silver					
	Thallium					
	Vanadium					
	Zinc	●●●	●●●	●●●	●●●	●●●

SCHEDULE 4: IVACO ROLLING MILLS

		NAME OF EFFLUENT STREAM:	East Discharge	North-East Discharge	South-East Discharge	Mill Pond Outlet	East Discharge
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes	No	No	No	Yes
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	Yes	No	No	No	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No	No	No	No	Yes
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No	No	No	No	Yes
		QUALITY CONTROL MONITORING REQUIRED:	Yes	No	No	Yes	Yes
		FREQUENCY OF SAMPLING:	M	M	M	Event Oriented	Event Oriented
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED					
25	Solvent Extractables	Oil and grease	●●●	●●●	●●●	●●●	●●●
IS1	Iron	Iron	●●●	●●●	●●●		

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 5: LASCO

		NAME OF EFFLUENT STREAM:	South Pond				Storm Water Discharge Point	Waste Disposal Site	
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				No	No	
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	Yes				No	No	
		MONITORING REQUIRED FOR ATGs 24 and 27:	Yes				No	No	
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				No	No	
		QUALITY CONTROL MONITORING REQUIRED:	Yes				No	No	
		FREQUENCY OF SAMPLING:	D	TW	W	M	M	Event Oriented	
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
3	Hydrogen ion (pH)	Hydrogen ion (pH)	●●●				●●●	●●●	
5a	Organic carbon	Dissolved organic carbon (DOC)			●●●				
5b		Total organic carbon (TOC)							
6	Total phosphorus	Total phosphorus			●●●				
7	Specific conductance	Specific conductance	●●●						
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●				●●●	●●●	
		Volatile suspended solids (VSS)	●●●				●●●	●●●	
9	Total metals	Aluminum				●●●			
		Beryllium				●●●			
		Cadmium				●●●			
		Chromium				●●●			
		Cobalt				●●●			
		Copper		●●●			●●●	●●●	
		Lead				●●●			
		Molybdenum				●●●			
		Nickel				●●●			
		Silver				●●●			
		Thallium				●●●			
		Vanadium							
		Zinc		●●●			●●●	●●●	

SCHEDULE 5: LASCO

		NAME OF EFFLUENT STREAM:	South Pond				Storm Water Discharge Point	Waste Disposal Site
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				No	No
		CHARACTERIZATION SAMPLING REQUIRED (except for AT6s 24 and 27):	Yes				No	No
		MONITORING REQUIRED FOR AT6s 24 and 27:	Yes				No	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				No	No
		QUALITY CONTROL MONITORING REQUIRED:	Yes				No	No
		FREQUENCY OF SAMPLING:	D	TW	W	M	M	Event Oriented
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED						
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane				●●●		
		1,1,2-Trichloroethane				●●●		
		1,1-Dichloroethane				●●●		
		1,1-Dichloroethylene				●●●		
		1,2-Dichlorobenzene				●●●		
		1,2-Dichloroethane (Ethylene dichloride)				●●●		
		1,2-Dichloropropane				●●●		
		1,3-Dichlorobenzene				●●●		
		1,4-Dichlorobenzene				●●●		
		Bromoform				●●●		
		Bromomethane				●●●		
		Carbon tetrachloride				●●●		
		Chlorobenzene				●●●		
		Chloroform				●●●		
		Chloromethane				●●●		
		Cis-1,3-Dichloropropylene				●●●		
		Dibromochloromethane				●●●		
		Ethylene dibromide				●●●		
		Methylene chloride				●●●		
		Tetrachloroethylene (Perchloroethylene)				●●●		
		Trans-1,2-Dichloroethylene				●●●		
		Trans-1,3-Dichloropropylene				●●●		
		Trichloroethylene				●●●		
		Trichlorofluoromethane				●●●		
		Vinyl chloride (Chloroethylene)				●●●		

SCHEDULE 5: LASCO

NAME OF EFFLUENT STREAM:		South Pond				Storm Water Discharge Point	Waste Disposal Site
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		Yes				No	No
CHARACTERIZATION SAMPLING REQUIRED (except for AT6s 24 and 27):		Yes				No	No
MONITORING REQUIRED FOR AT6s 24 and 27:		Yes				No	No
OPEN CHARACTERIZATION SAMPLING REQUIRED:		Yes				No	No
QUALITY CONTROL MONITORING REQUIRED:		Yes				No	No
FREQUENCY OF SAMPLING:		D	TW	W	M	M	Event Oriented
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED						
19 Extractables, Base Neutral	Acenaphthene				●●●		
	5-nitro Acenaphthene				●●●		
	Acenaphthylene				●●●		
	Anthracene				●●●		
	Benz(a)anthracene				●●●		
	Benzo(a)pyrene				●●●		
	Benzo(b)fluoranthene				●●●		
	Benzo(g,h,i)perylene				●●●		
	Benzo(k)fluoranthene				●●●		
	Camphene				●●●		
	1-Chloronaphthalene				●●●		
	2-Chloronaphthalene				●●●		
	Chrysene				●●●		
	Dibenz(a,h)anthracene				●●●		
	Fluoranthene				●●●		
	Fluorene				●●●		
	Indeno(1,2,3-cd)pyrene				●●●		
	Indole				●●●		
	1-Methylnaphthalene				●●●		
	2-Methylnaphthalene				●●●		
	Naphthalene				●●●		
	Perylene				●●●		
	Phenanthrene				●●●		
	Pyrene				●●●		
	Benzyl butyl phthalate				●●●		
	Bis(2-ethylhexyl) phthalate				●●●		
	Di-n-butyl phthalate				●●●		
	Di-n-octyl phthalate				●●●		

SCHEDULE 5: LASCO

		NAME OF EFFLUENT STREAM:	South Pond				Storm Water Discharge Point	Waste Disposal Site
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				No	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	Yes				No	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	Yes				No	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				No	No
		QUALITY CONTROL MONITORING REQUIRED:	Yes				No	No
		FREQUENCY OF SAMPLING:	D	TW	W	M	M	Event Oriented
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED						
19	Extractables, Base Neutral (continued)	4-Bromophenyl phenyl ether				●●●		
		4-Chlorophenyl phenyl ether				●●●		
		Bis(2-chloroisopropyl)ether				●●●		
		Bis(2-chloroethyl)ether				●●●		
		2,4-Dinitrotoluene				●●●		
		2,6-Dinitrotoluene				●●●		
		Bis(2-chloroethoxy)methane				●●●		
		Diphenylamine				●●●		
		N-Nitrosodiphenylamine				●●●		
		N-Nitrosodi-n-propylamine				●●●		
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene				●●●		
		1,2,3,5-Tetrachlorobenzene				●●●		
		1,2,4,5-Tetrachlorobenzene				●●●		
		1,2,3-Trichlorobenzene				●●●		
		1,2,4-Trichlorobenzene				●●●		
		2,4,5-Trichlorotoluene				●●●		
		Hexachlorobenzene				●●●		
		Hexachlorobutadiene				●●●		
		Hexachlorocyclopentadiene				●●●		
		Hexachloroethane				●●●		
		Octachlorostyrene				●●●		
		Pentachlorobenzene				●●●		
25	Solvent Extractables	Oil and grease	●●●				●●●	●●●
IS1	Iron	Iron			●●●		●●●	●●●

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 6: STELCO STEEL HILTON WORKS

		NAME OF EFFLUENT STREAM:	#2 Rod Mill				20" Mill				East Side Filter Plant			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes				Yes			
		CHARACTERIZATION SAMPLING REQUIRED (except for AT6s 24 and 27):	Yes				Yes				Yes			
		MONITORING REQUIRED FOR AT6s 24 and 27:	Yes				Yes				Yes			
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				Yes				Yes			
		QUALITY CONTROL MONITORING REQUIRED:	No				No				Yes			
		FREQUENCY OF SAMPLING:	D	TW	W	M	D	TW	W	M	D	TW	W	M
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED												
2	Total cyanide	Total cyanide				●●●						●●●		
3	Hydrogen ion (pH)	Hydrogen ion (pH)	●●●				●●●				●●●			
4a	Nitrogen	Ammonia plus Ammonium				●●●						●●●		
		Total Kjeldahl nitrogen				●●●								
4b		Nitrate + Nitrite												
5a	Organic carbon	Dissolved organic carbon (DOC)			●●●				●●●			●●●		
5b		Total organic carbon (TOC)												
6	Total phosphorus	Total phosphorus			●●●				●●●				●●●	
7	Specific conductance	Specific conductance	●●●				●●●				●●●			
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●				●●●				●●●			
		Volatile suspended solids (VSS)	●●●				●●●				●●●			
9	Total metals	Aluminum				●●●				●●●				●●●
		Beryllium				●●●				●●●				●●●
		Cadmium				●●●				●●●				●●●
		Chromium				●●●				●●●		●●●		
		Cobalt				●●●				●●●				●●●
		Copper				●●●				●●●				●●●
		Lead		●●●				●●●				●●●		

SCHEDULE 6: STELCO STEEL HILTON WORKS

		NAME OF EFFLUENT STREAM:	#2 Rod Mill				20" Mill				East Side Filter Plant			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes				Yes			
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	Yes				Yes				Yes			
		MONITORING REQUIRED FOR ATGs 24 and 27:	Yes				Yes				Yes			
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				Yes				Yes			
		QUALITY CONTROL MONITORING REQUIRED:	No				No				Yes			
		FREQUENCY OF SAMPLING:	D	TW	W	M	D	TW	W	M	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED												
9	Total metals (continued)	Molybdenum				●●●				●●●				●●●
		Nickel				●●●				●●●				●●●
		Silver				●●●				●●●				●●●
		Thallium				●●●				●●●				●●●
		Vanadium				●●●				●●●				●●●
		Zinc		●●●				●●●				●●●		
10	Hydrides	Antimony												●●●
		Arsenic												●●●
		Selenium												●●●
12	Mercury	Mercury												●●●
14	Phenolics (4AAP)	Phenolics (4AAP)			●●●				●●●			●●●		
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane				●●●				●●●				●●●
		1,1,2-Trichloroethane				●●●				●●●				●●●
		1,1-Dichloroethane				●●●				●●●				●●●
		1,1-Dichloroethylene				●●●				●●●				●●●
		1,2-Dichlorobenzene				●●●				●●●				●●●
		1,2-Dichloroethane (Ethylene dichloride)				●●●				●●●				●●●
		1,2-Dichloropropane				●●●				●●●				●●●
		1,3-Dichlorobenzene				●●●				●●●				●●●
		1,4-Dichlorobenzene				●●●				●●●				●●●
		Bromoform				●●●				●●●				●●●
		Bromomethane				●●●				●●●				●●●
		Carbon tetrachloride				●●●				●●●				●●●

SCHEDULE 6: STELCO STEEL HILTON WORKS

		NAME OF EFFLUENT STREAM:	#2 Rod Mill				20" Mill				East Side Filter Plant			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes				Yes			
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	Yes				Yes				Yes			
		MONITORING REQUIRED FOR ATGs 24 and 27:	Yes				Yes				Yes			
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				Yes				Yes			
		QUALITY CONTROL MONITORING REQUIRED:	No				No				Yes			
		FREQUENCY OF SAMPLING:	D	TW	W	M	D	TW	W	M	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED												
16	Volatiles, Halogenated (continued)	Chlorobenzene				●●●				●●●				●●●
		Chloroform				●●●				●●●				●●●
		Chloromethane				●●●				●●●				●●●
		Cis-1,3-Dichloropropylene				●●●				●●●				●●●
		Dibromochloromethane				●●●				●●●				●●●
		Ethylene dibromide				●●●				●●●				●●●
		Methylene chloride				●●●				●●●				●●●
		Tetrachloroethylene (Perchloroethylene)				●●●				●●●				●●●
		Trans-1,2-Dichloroethylene				●●●				●●●				●●●
		Trans-1,3-Dichloropropylene				●●●				●●●				●●●
		Trichloroethylene				●●●				●●●				●●●
		Trichlorofluoromethane				●●●				●●●				●●●
		Vinyl chloride (Chloroethylene)				●●●				●●●				●●●
17	Volatiles, Non-Halogenated	Benzene										●●●		
		Styrene												●●●
		Toluene												●●●
		o-Xylene												●●●
		m-Xylene and p-Xylene												●●●
19	Extractables, Base Neutral	Acenaphthene				●●●				●●●				●●●
		5-nitro Acenaphthene				●●●				●●●				●●●
		Acenaphthylene				●●●				●●●				●●●
		Anthracene				●●●				●●●				●●●
		Benz(a)anthracene				●●●				●●●				●●●
		Benzo(a)pyrene				●●●				●●●		●●●		
		Benzo(b)fluoranthene				●●●				●●●				●●●

SCHEDULE 6: STELCO STEEL HILTON WORKS

		NAME OF EFFLUENT STREAM:	#2 Rod Mill				20" Mill				East Side Filter Plant			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes				Yes			
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	Yes				Yes				Yes			
		MONITORING REQUIRED FOR ATGs 24 and 27:	Yes				Yes				Yes			
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				Yes				Yes			
		QUALITY CONTROL MONITORING REQUIRED:	No				No				Yes			
		FREQUENCY OF SAMPLING:	D	TW	W	M	D	TW	W	M	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED												
19	Extractables, Base Neutral (continued)	Benzo(g,h,i)perylene				●●●				●●●				●●●
		Benzo(k)fluoranthene				●●●				●●●				●●●
		Camphene				●●●				●●●				●●●
		1-Chloronaphthalene				●●●				●●●				●●●
		2-Chloronaphthalene				●●●				●●●				●●●
		Chrysene				●●●				●●●				●●●
		Dibenz(a,h)anthracene				●●●				●●●				●●●
		Fluoranthene				●●●				●●●				●●●
		Fluorene				●●●				●●●				●●●
		Indeno(1,2,3-cd)pyrene				●●●				●●●				●●●
		Indole				●●●				●●●				●●●
		1-Methylnaphthalene				●●●				●●●				●●●
		2-Methylnaphthalene				●●●				●●●				●●●
		Naphthalene				●●●				●●●		●●●		
		Perylene				●●●				●●●				●●●
		Phenanthrene				●●●				●●●				●●●
		Pyrene				●●●				●●●				●●●
		Benzyl butyl phthalate				●●●				●●●				●●●
		Bis(2-ethylhexyl) phthalate				●●●				●●●				●●●
		Di-n-butyl phthalate				●●●				●●●				●●●
		Di-n-octyl phthalate				●●●				●●●				●●●
		4-Bromophenyl phenyl ether				●●●				●●●				●●●
		4-Chlorophenyl phenyl ether				●●●				●●●				●●●
		Bis(2-chloroisopropyl)ether				●●●				●●●				●●●
		Bis(2-chloroethyl)ether				●●●				●●●				●●●
		2,4-Dinitrotoluene				●●●				●●●				●●●
		2,6-Dinitrotoluene				●●●				●●●				●●●

SCHEDULE 6: STELCO STEEL HILTON WORKS

		NAME OF EFFLUENT STREAM:	#2 Rod Mill				20" Mill				East Side Filter Plant			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes				Yes			
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	Yes				Yes				Yes			
		MONITORING REQUIRED FOR ATGs 24 and 27:	Yes				Yes				Yes			
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				Yes				Yes			
		QUALITY CONTROL MONITORING REQUIRED:	No				No				Yes			
		FREQUENCY OF SAMPLING:	D	TW	W	M	D	TW	W	M	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED												
19	Extractables, Base Neutral (continued)	Bis(2-chloroethoxy)methane				●●●				●●●				●●●
		Diphenylamine				●●●				●●●				●●●
		N-Nitrosodiphenylamine				●●●				●●●				●●●
		N-Nitrosodi-n-propylamine				●●●				●●●				●●●
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol												
		2,3,4,6-Tetrachlorophenol												●●●
		2,3,5,6-Tetrachlorophenol												●●●
		2,3,4-Trichlorophenol												●●●
		2,3,5-Trichlorophenol												●●●
		2,4,5-Trichlorophenol												●●●
		2,4,6-Trichlorophenol												●●●
		2,4-Dimethyl phenol												●●●
		2,4-Dinitrophenol												●●●
		2,4-Dichlorophenol												●●●
		2,6-Dichlorophenol												●●●
		4,6-Dinitro-o-cresol												●●●
		2-Chlorophenol												●●●
		4-Chloro-3-methylphenol												●●●
		4-Nitrophenol												●●●
		m-Cresol												●●●
		o-Cresol												●●●
		p-Cresol												●●●
		Pentachlorophenol												●●●
		Phenol												●●●

SCHEDULE 6: STELCO STEEL HILTON WORKS

NAME OF EFFLUENT STREAM:			#2 Rod Mill				20" Mill				East Side Filter Plant			
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:			Yes				Yes				Yes			
CHARACTERIZATION SAMPLING REQUIRED (except for AT6s 24 and 27):			Yes				Yes				Yes			
MONITORING REQUIRED FOR AT6s 24 and 27:			Yes				Yes				Yes			
OPEN CHARACTERIZATION SAMPLING REQUIRED:			Yes				Yes				Yes			
QUALITY CONTROL MONITORING REQUIRED:			No				No				Yes			
FREQUENCY OF SAMPLING:			D	TW	W	M	D	TW	W	M	D	TW	W	M
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED												
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene				●●●				●●●				●●●
		1,2,3,5-Tetrachlorobenzene				●●●				●●●				●●●
		1,2,4,5-Tetrachlorobenzene				●●●				●●●				●●●
		1,2,3-Trichlorobenzene				●●●				●●●				●●●
		1,2,4-Trichlorobenzene				●●●				●●●				●●●
		2,4,5-Trichlorotoluene				●●●				●●●				●●●
		Hexachlorobenzene				●●●				●●●				●●●
		Hexachlorobutadiene				●●●				●●●				●●●
		Hexachlorocyclopentadiene				●●●				●●●				●●●
		Hexachloroethane				●●●				●●●				●●●
		Octachlorostyrene				●●●				●●●				●●●
		Pentachlorobenzene				●●●				●●●				●●●
25	Solvent Extractables	Oil and grease	●●●				●●●				●●●			
IS1	Iron	Iron			●●●				●●●				●●●	

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 6: STELCO STEEL HILTON WORKS

		NAME OF EFFLUENT STREAM:	North Outfall				West-Side Open Cut		North-West Outfall		#1 60" Sewer				#2 60" Sewer
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes		Yes		Yes				No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	Yes				Yes		Yes		Yes				No
		MONITORING REQUIRED FOR ATGs 24 and 27:	Yes				No		No		Yes				No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				No		No		Yes				No
		QUALITY CONTROL MONITORING REQUIRED:	No				Yes		No		No				No
		FREQUENCY OF SAMPLING:	D	TW	W	M	W	M	W	M	D	TW	W	M	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
2	Total cyanide	Total cyanide			●●●		●●●		●●●						●●●
3	Hydrogen ion (pH)	Hydrogen ion (pH)	●●●					●●●		●●●	●●●				●●●
4a	Nitrogen	Ammonia plus Ammonium			●●●		●●●		●●●						●●●
		Total Kjeldahl nitrogen													
4b		Nitrate + Nitrite													
5a	Organic carbon	Dissolved organic carbon (DOC)		●●●				●●●		●●●		●●●			
5b		Total organic carbon (TOC)													
6	Total phosphorus	Total phosphorus			●●●			●●●		●●●			●●●		
7	Specific conductance	Specific conductance	●●●								●●●				
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●				●●●		●●●		●●●				●●●
		Volatile suspended solids (VSS)	●●●				●●●		●●●		●●●				●●●
9	Total metals	Aluminum				●●●								●●●	
		Beryllium				●●●								●●●	
		Cadmium				●●●								●●●	
		Chromium				●●●		●●●		●●●		●●●			●●●
		Cobalt				●●●								●●●	
		Copper				●●●								●●●	
		Lead		●●●				●●●		●●●		●●●			●●●

SCHEDULE 6: STELCO STEEL HILTON WORKS

		NAME OF EFFLUENT STREAM:	North Outfall				West-Side Open Cut		North-West Outfall		#1 60" Sewer				#2 60" Sewer
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes		Yes		Yes				No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	Yes				Yes		Yes		Yes				No
		MONITORING REQUIRED FOR ATGs 24 and 27:	Yes				No		No		Yes				No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				No		No		Yes				No
		QUALITY CONTROL MONITORING REQUIRED:	No				Yes		No		No				No
		FREQUENCY OF SAMPLING:	D	TW	W	M	W	M	W	M	D	TW	W	M	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
9	Total metals (continued)	Molybdenum				●●●								●●●	
		Nickel				●●●								●●●	
		Silver				●●●								●●●	
		Thallium				●●●								●●●	
		Vanadium				●●●								●●●	
		Zinc		●●●			●●●		●●●			●●●			●●●
10	Hydrides	Antimony												●●●	
		Arsenic												●●●	
		Selenium												●●●	
12	Mercury	Mercury													
14	Phenolics (4AAP)	Phenolics (4AAP)			●●●		●●●		●●●						●●●
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane				●●●								●●●	
		1,1,2-Trichloroethane				●●●								●●●	
		1,1-Dichloroethane				●●●								●●●	
		1,1-Dichloroethylene				●●●								●●●	
		1,2-Dichlorobenzene				●●●								●●●	
		1,2-Dichloroethane (Ethylene dichloride)				●●●								●●●	
		1,2-Dichloropropane				●●●								●●●	
		1,3-Dichlorobenzene				●●●								●●●	
		1,4-Dichlorobenzene				●●●								●●●	
		Bromoform				●●●								●●●	
		Bromomethane				●●●								●●●	
		Carbon tetrachloride				●●●								●●●	

SCHEDULE 6: STELCO STEEL HILTON WORKS

		NAME OF EFFLUENT STREAM:	North Outfall				West-Side Open Cut		North-West Outfall		#1 60" Sewer				#2 60" Sewer
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes		Yes		Yes				No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	Yes				Yes		Yes		Yes				No
		MONITORING REQUIRED FOR ATGs 24 and 27:	Yes				No		No		Yes				No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				No		No		Yes				No
		QUALITY CONTROL MONITORING REQUIRED:	No				Yes		No		No				No
		FREQUENCY OF SAMPLING:	D	TW	W	M	W	M	W	M	D	TW	W	M	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
16	Volatiles, Halogenated (continued)	Chlorobenzene				●●●								●●●	
		Chloroform				●●●								●●●	
		Chloromethane				●●●								●●●	
		Cis-1,3-Dichloropropylene				●●●								●●●	
		Dibromochloromethane				●●●								●●●	
		Ethylene dibromide				●●●								●●●	
		Methylene chloride				●●●								●●●	
		Tetrachloroethylene (Perchloroethylene)				●●●								●●●	
		Trans-1,2-Dichloroethylene				●●●								●●●	
		Trans-1,3-Dichloropropylene				●●●								●●●	
		Trichloroethylene				●●●								●●●	
		Trichlorofluoromethane				●●●								●●●	
		Vinyl chloride (Chloroethylene)				●●●								●●●	
17	Volatiles, Non-Halogenated	Benzene													●●●
		Styrene													
		Toluene													
		o-Xylene													
		m-Xylene and p-Xylene													
19	Extractables, Base Neutral	Acenaphthene				●●●									
		5-nitro Acenaphthene				●●●									
		Acenaphthylene				●●●									
		Anthracene				●●●									
		Benz(a)anthracene				●●●									
		Benzo(a)pyrene				●●●									●●●
		Benzo(b)fluoranthene				●●●									

SCHEDULE 6: STELCO STEEL HILTON WORKS

NAME OF EFFLUENT STREAM:		North Outfall				West-Side Open Cut		North-West Outfall		#1 60" Sewer				#2 60" Sewer
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		Yes				Yes		Yes		Yes				No
CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):		Yes				Yes		Yes		Yes				No
MONITORING REQUIRED FOR ATGs 24 and 27:		Yes				No		No		Yes				No
OPEN CHARACTERIZATION SAMPLING REQUIRED:		Yes				No		No		Yes				No
QUALITY CONTROL MONITORING REQUIRED:		No				Yes		No		No				No
FREQUENCY OF SAMPLING:		D	TW	W	M	W	M	W	M	D	TW	W	M	M
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
19 Extractables, Base Neutral (continued)	Benzo(g,h,i)perylene				●●●									
	Benzo(k)fluoranthene				●●●									
	Camphene				●●●									
	1-Chloronaphthalene				●●●									
	2-Chloronaphthalene				●●●									
	Chrysene				●●●									
	Dibenz(a,h)anthracene				●●●									
	Fluoranthene				●●●									
	Fluorene				●●●									
	Indeno(1,2,3-cd)pyrene				●●●									
	Indole				●●●									
	1-Methylnaphthalene				●●●									
	2-Methylnaphthalene				●●●									●●●
	Naphthalene				●●●									
	Perylene				●●●									
	Phenanthrene				●●●									
	Pyrene				●●●									
	Benzyl butyl phthalate				●●●									
	Bis(2-ethylhexyl) phthalate				●●●									
	Di-n-butyl phthalate				●●●									
	Di-n-octyl phthalate				●●●									
	4-Bromophenyl phenyl ether				●●●									
	4-Chlorophenyl phenyl ether				●●●									
	Bis(2-chloroisopropyl)ether				●●●									
	Bis(2-chloroethyl)ether				●●●									
	2,4-Dinitrotoluene				●●●									
	2,6-Dinitrotoluene				●●●									

SCHEDULE 6: STELCO STEEL HILTON WORKS

		NAME OF EFFLUENT STREAM:	North Outfall				West-Side Open Cut		North-West Outfall		#1 60" Sewer				#2 60" Sewer
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes		Yes		Yes				No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	Yes				Yes		Yes		Yes				No
		MONITORING REQUIRED FOR ATGs 24 and 27:	Yes				No		No		Yes				No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	Yes				No		No		Yes				No
		QUALITY CONTROL MONITORING REQUIRED:	No				Yes		No		No				No
		FREQUENCY OF SAMPLING:	D	TW	W	M	W	M	W	M	D	TW	W	M	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
19	Extractables, Base Neutral (continued)	Bis(2-chloroethoxy)methane				•••									
		Diphenylamine				•••									
		N-Nitrosodiphenylamine				•••									
		N-Nitrosodi-n-propylamine				•••									
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol													
		2,3,4,6-Tetrachlorophenol													
		2,3,5,6-Tetrachlorophenol													
		2,3,4-Trichlorophenol													
		2,3,5-Trichlorophenol													
		2,4,5-Trichlorophenol													
		2,4,6-Trichlorophenol													
		2,4-Dimethyl phenol													
		2,4-Dinitrophenol													
		2,4-Dichlorophenol													
		2,6-Dichlorophenol													
		4,6-Dinitro-o-cresol													
		2-Chlorophenol													
		4-Chloro-3-methylphenol													
		4-Nitrophenol													
		m-Cresol													
		o-Cresol													
		p-Cresol													
		Pentachlorophenol													
		Phenol													

SCHEDULE 6: STELCO STEEL HILTON WORKS

NAME OF EFFLUENT STREAM:		North Outfall				West-Side Open Cut		North-West Outfall		#1 60" Sewer				#2 60" Sewer
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		Yes				Yes		Yes		Yes				No
CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):		Yes				Yes		Yes		Yes				No
MONITORING REQUIRED FOR ATGs 24 and 27:		Yes				No		No		Yes				No
OPEN CHARACTERIZATION SAMPLING REQUIRED:		Yes				No		No		Yes				No
QUALITY CONTROL MONITORING REQUIRED:		No				Yes		No		No				No
FREQUENCY OF SAMPLING:		D	TW	W	M	W	M	W	M	D	TW	W	M	M
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
23 Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene				●●●								●●●	
	1,2,3,5-Tetrachlorobenzene				●●●								●●●	
	1,2,4,5-Tetrachlorobenzene				●●●								●●●	
	1,2,3-Trichlorobenzene				●●●								●●●	
	1,2,4-Trichlorobenzene				●●●								●●●	
	2,4,5-Trichlorotoluene				●●●								●●●	
	Hexachlorobenzene				●●●								●●●	
	Hexachlorobutadiene				●●●								●●●	
	Hexachlorocyclopentadiene				●●●								●●●	
	Hexachloroethane				●●●								●●●	
	Octachlorostyrene				●●●								●●●	
	Pentachlorobenzene				●●●								●●●	
25 Solvent Extractables	Oil and grease	●●●				●●●		●●●		●●●				●●●
IS1 Iron	Iron			●●●		●●●		●●●					●●●	●●●

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 6: STELCO STEEL HILTON WORKS

		NAME OF EFFLUENT STREAM:	East Side Filter Plant Overflow Weir
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No
		QUALITY CONTROL MONITORING REQUIRED:	No
		FREQUENCY OF SAMPLING:	Event Oriented
ANALYTICAL TEST GROUP		**PARAMETERS TO BE ANALYZED**	
2	Total cyanide	Total cyanide	●●●
3	Hydrogen ion (pH)	Hydrogen ion (pH)	●●●
4a	Nitrogen	Ammonia plus Ammonium	●●●
		Total Kjeldahl nitrogen	
4b		Nitrate + Nitrite	
5a	Organic carbon	Dissolved organic carbon (DOC)	
5b		Total organic carbon (TOC)	
6	Total phosphorus	Total phosphorus	
7	Specific conductance	Specific conductance	
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●
		Volatile suspended solids (VSS)	●●●
9	Total metals	Aluminum	
		Beryllium	
		Cadmium	
		Chromium	●●●
		Cobalt	
		Copper	
		Lead	●●●

SCHEDULE 6: STELCO STEEL HILTON WORKS

		NAME OF EFFLUENT STREAM:	East Side Filter Plant Overflow Weir
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No
		QUALITY CONTROL MONITORING REQUIRED:	No
		FREQUENCY OF SAMPLING:	Event Oriented
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED	
9	Total metals (continued)	Molybdenum	
		Nickel	
		Silver	
		Thallium	
		Vanadium	
		Zinc	●●●
10	Hydrides	Antimony	
		Arsenic	
		Selenium	
12	Mercury	Mercury	
14	Phenolics (4AAP)	Phenolics (4AAP)	●●●
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane	
		1,1,2-Trichloroethane	
		1,1-Dichloroethane	
		1,1-Dichloroethylene	
		1,2-Dichlorobenzene	
		1,2-Dichloroethane (Ethylene dichloride)	
		1,2-Dichloropropane	
		1,3-Dichlorobenzene	
		1,4-Dichlorobenzene	
		Bromoform	
		Bromomethane	
		Carbon tetrachloride	

SCHEDULE 6: STELCO STEEL MILTON WORKS

		NAME OF EFFLUENT STREAM:	East Side Filter Plant Overflow Weir
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No
		QUALITY CONTROL MONITORING REQUIRED:	No
		FREQUENCY OF SAMPLING:	Event Oriented
ANALYTICAL TEST GROUP		**PARAMETERS TO BE ANALYZED**	
16	Volatiles, Halogenated (continued)	Chlorobenzene	
		Chloroform	
		Chloromethane	
		Cis-1,3-Dichloropropylene	
		Dibromochloromethane	
		Ethylene dibromide	
		Methylene chloride	
		Tetrachloroethylene (Perchloroethylene)	
		Trans-1,2-Dichloroethylene	
		Trans-1,3-Dichloropropylene	
		Trichloroethylene	
		Trichlorofluoromethane	
		Vinyl chloride (Chloroethylene)	
17	Volatiles, Non-Halogenated	Benzene	●●●
		Styrene	
		Toluene	
		o-Xylene	
		m-Xylene and p-Xylene	
19	Extractables, Base Neutral	Acenaphthene	
		5-nitro Acenaphthene	
		Acenaphthylene	
		Anthracene	
		Benz(a)enthracene	
		Benzo(a)pyrene	●●●
		Benzo(b)fluoranthene	

SCHEDULE 6: STELCO STEEL HILTON WORKS

		NAME OF EFFLUENT STREAM:	East Side Filter Plant Overflow Weir
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No
		QUALITY CONTROL MONITORING REQUIRED:	No
		FREQUENCY OF SAMPLING:	Event Oriented
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED	
19	Extractables, Base Neutral (continued)	Benzo(g,h,i)perylene	
		Benzo(k)fluoranthene	
		Camphene	
		1-Chloronaphthalene	
		2-Chloronaphthalene	
		Chrysene	
		Dibenz(a,h)anthracene	
		Fluoranthene	
		Fluorene	
		Indeno(1,2,3-cd)pyrene	
		Indole	
		1-Methylnaphthalene	
		2-Methylnaphthalene	
		Naphthalene	●●●
		Perylene	
		Phenanthrene	
		Pyrene	
		Benzyl butyl phthalate	
		Bis(2-ethylhexyl) phthalate	
		Di-n-butyl phthalate	
		Di-n-octyl phthalate	
		4-Bromophenyl phenyl ether	
		4-Chlorophenyl phenyl ether	
		Bis(2-chloroisopropyl)ether	
		Bis(2-chloroethyl)ether	
		2,4-Dinitrotoluene	
		2,6-Dinitrotoluene	

SCHEDULE 6: STELCO STEEL HILTON WORKS

NAME OF EFFLUENT STREAM:		East Side Filter Plant Overflow Weir
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		No
CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):		No
MONITORING REQUIRED FOR ATGs 24 and 27:		No
OPEN CHARACTERIZATION SAMPLING REQUIRED:		No
QUALITY CONTROL MONITORING REQUIRED:		No
FREQUENCY OF SAMPLING:		Event Oriented
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED	
19 Extractables, Base Neutral (continued)	Bis(2-chloroethoxy)methane	
	Diphenylamine	
	N-Nitrosodiphenylamine	
	N-Nitrosodi-n-propylamine	
20 Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	
	2,3,4,6-Tetrachlorophenol	
	2,3,5,6-Tetrachlorophenol	
	2,3,4-Trichlorophenol	
	2,3,5-Trichlorophenol	
	2,4,5-Trichlorophenol	
	2,4,6-Trichlorophenol	
	2,4-Dimethyl phenol	
	2,4-Dinitrophenol	
	2,4-Dichlorophenol	
	2,6-Dichlorophenol	
	4,6-Dinitro-o-cresol	
	2-Chlorophenol	
	4-Chloro-3-methylphenol	
	4-Nitrophenol	
	m-Cresol	
	o-Cresol	
	p-Cresol	
	Pentachlorophenol	
	Phenol	

SCHEDULE 6: STELCO STEEL HILTON WORKS

		NAME OF EFFLUENT STREAM:	East Side Filter Plant Overflow Weir
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No
		QUALITY CONTROL MONITORING REQUIRED:	No
		FREQUENCY OF SAMPLING:	Event Oriented
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED	
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene	
		1,2,3,5-Tetrachlorobenzene	
		1,2,4,5-Tetrachlorobenzene	
		1,2,3-Trichlorobenzene	
		1,2,4-Trichlorobenzene	
		2,4,5-Trichlorotoluene	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Octachlorostyrene	
		Pentachlorobenzene	
25	Solvent Extractables	Oil and grease	•••
IS1	Iron	Iron	•••

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 7: STELCO STEEL LAKE ERIE WORKS

		NAME OF EFFLUENT STREAM:	Blowdown Treatment Plant			#4 Pond Discharge				Storm Water Pond #2	Lagoon E	Coal Storage Area
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No			Yes				No	No	No
		CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):	No			Yes				No	No	No
		MONITORING REQUIRED FOR ATGs 24 and 27:	No			Yes				No	No	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No			Yes				No	No	No
		QUALITY CONTROL MONITORING REQUIRED:	Yes			Yes				No	No	No
		FREQUENCY OF SAMPLING:	TW	W	M	D	TW	W	M	M	Event Oriented	Event Oriented
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
2	Total cyanide	Total cyanide	●●●					●●●		●●●	●●●	●●●
3	Hydrogen ion (pH)	Hydrogen ion (pH)	●●●			●●●				●●●	●●●	●●●
4a	Nitrogen	Ammonia plus Ammonium	●●●					●●●		●●●	●●●	●●●
		Total Kjeldahl nitrogen										
4b		Nitrate + Nitrite										
5a	Organic carbon	Dissolved organic carbon (DOC)					●●●					
5b		Total organic carbon (TOC)										
6	Total phosphorus	Total phosphorus		●●●				●●●				
7	Specific conductance	Specific conductance				●●●						
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●			●●●				●●●	●●●	●●●
		Volatile suspended solids (VSS)	●●●			●●●				●●●	●●●	●●●
9	Total metals	Aluminum							●●●			
		Beryllium							●●●			
		Cadmium						●●●				
		Chromium	●●●						●●●	●●●	●●●	●●●
		Cobalt							●●●			
		Copper							●●●			
		Lead	●●●						●●●	●●●	●●●	●●●

SCHEDULE 7: STELCO STEEL LAKE ERIE WORKS

NAME OF EFFLUENT STREAM:		Blowdown Treatment Plant			#4 Pond Discharge				Storm Water Pond #2	Lagoon E	Coal Storage Area
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		No			Yes				No	No	No
CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):		No			Yes				No	No	No
MONITORING REQUIRED FOR ATGs 24 and 27:		No			Yes				No	No	No
OPEN CHARACTERIZATION SAMPLING REQUIRED:		No			Yes				No	No	No
QUALITY CONTROL MONITORING REQUIRED:		Yes			Yes				No	No	No
FREQUENCY OF SAMPLING:		TW	W	M	D	TW	W	M	M	Event Oriented	Event Oriented
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
9 Total metals (continued)	Molybdenum							●●●			
	Nickel							●●●			
	Silver							●●●			
	Thallium							●●●			
	Vanadium							●●●			
	Zinc	●●●						●●●	●●●	●●●	●●●
10 Hydrides	Antimony							●●●			
	Arsenic							●●●			
	Selenium							●●●			
12 Mercury	Mercury							●●●			
14 Phenolics (4AAP)	Phenolics (4AAP)	●●●					●●●		●●●	●●●	●●●
15 Sulphide	Sulphide									●●●	
16 Volatiles, Halogenated	1,1,2,2-Tetrachloroethane							●●●			
	1,1,2-Trichloroethane							●●●			
	1,1-Dichloroethane							●●●			
	1,1-Dichloroethylene							●●●			
	1,2-Dichlorobenzene							●●●			
	1,2-Dichloroethane (Ethylene dichloride)							●●●			
	1,2-Dichloropropane							●●●			
	1,3-Dichlorobenzene							●●●			
	1,4-Dichlorobenzene							●●●			
	Bromoform							●●●			

SCHEDULE 7: STELCO STEEL LAKE ERIE WORKS

NAME OF EFFLUENT STREAM:			Blowdown Treatment Plant			#4 Pond Discharge				Storm Water Pond #2	Lagoon E	Coal Storage Area
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:			No			Yes				No	No	No
CHARACTERIZATION SAMPLING REQUIRED (except for AT6s 24 and 27):			No			Yes				No	No	No
MONITORING REQUIRED FOR AT6s 24 and 27:			No			Yes				No	No	No
OPEN CHARACTERIZATION SAMPLING REQUIRED:			No			Yes				No	No	No
QUALITY CONTROL MONITORING REQUIRED:			Yes			Yes				No	No	No
FREQUENCY OF SAMPLING:			TW	W	M	D	TW	W	M	M	Event Oriented	Event Oriented
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED										
16	Volatiles, Halogenated (continued)	Bromomethane							●●●			
		Carbon tetrachloride							●●●			
		Chlorobenzene							●●●			
		Chloroform							●●●			
		Chloromethane							●●●			
		Cis-1,3-Dichloropropylene							●●●			
		Dibromochloromethane							●●●			
		Ethylene dibromide							●●●			
		Methylene chloride							●●●			
		Tetrachloroethylene (Perchloroethylene)							●●●			
		Trans-1,2-Dichloroethylene							●●●			
		Trans-1,3-Dichloropropylene							●●●			
		Trichloroethylene							●●●			
		Trichlorofluoromethane							●●●			
		Vinyl chloride (Chloroethylene)							●●●			
17	Volatiles, Non-Halogenated	Benzene	●●●						●●●	●●●	●●●	●●●
		Ethylbenzene			●●●				●●●			
		Styrene			●●●				●●●			
		Toluene			●●●				●●●			
		o-Xylene			●●●				●●●			
		m-Xylene and p-Xylene			●●●				●●●			
19	Extractables, Base Neutral	Acenaphthene			●●●				●●●			
		5-nitro Acenaphthene			●●●				●●●			
		Acenaphthylene			●●●				●●●			
		Anthracene			●●●				●●●			

SCHEDULE 7: STELCO STEEL LAKE ERIE WORKS

NAME OF EFFLUENT STREAM:		Blowdown Treatment Plant			#4 Pond Discharge				Storm Water Pond #2	Lagoon E	Coal Storage Area
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		No			Yes				No	No	No
CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):		No			Yes				No	No	No
MONITORING REQUIRED FOR ATGs 24 and 27:		No			Yes				No	No	No
OPEN CHARACTERIZATION SAMPLING REQUIRED:		No			Yes				No	No	No
QUALITY CONTROL MONITORING REQUIRED:		Yes			Yes				No	No	No
FREQUENCY OF SAMPLING:		TW	W	M	D	TW	W	M	M	Event Oriented	Event Oriented
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
19 Extractables, Base Neutral (continued)	Benz(a)anthracene			●●●				●●●			
	Benzo(a)pyrene	●●●						●●●	●●●	●●●	●●●
	Benzo(b)fluoranthene			●●●				●●●			
	Benzo(g,h,i)perylene			●●●				●●●			
	Benzo(k)fluoranthene			●●●				●●●			
	Camphene			●●●				●●●			
	1-Chloronaphthalene			●●●				●●●			
	2-Chloronaphthalene			●●●				●●●			
	Chrysene			●●●				●●●			
	Dibenz(a,h)anthracene			●●●				●●●			
	Fluoranthene			●●●				●●●			
	Fluorene			●●●				●●●			
	Indeno(1,2,3-cd)pyrene			●●●				●●●			
	Indole			●●●				●●●			
	1-Methylnaphthalene			●●●				●●●			
	2-Methylnaphthalene			●●●				●●●			
	Naphthalene	●●●						●●●	●●●	●●●	●●●
	Perylene			●●●				●●●			
	Phenanthrene			●●●				●●●			
	Pyrene			●●●				●●●			
	Benzyl butyl phthalate			●●●				●●●			
	Bis(2-ethylhexyl) phthalate			●●●				●●●			
	Di-n-butyl phthalate			●●●				●●●			
	Di-n-octyl phthalate			●●●				●●●			
	4-Bromophenyl phenyl ether			●●●				●●●			
	4-Chlorophenyl phenyl ether			●●●				●●●			
	Bis(2-chloroisopropyl)ether			●●●				●●●			

SCHEDULE 7: STELCO STEEL LAKE ERIE WORKS

NAME OF EFFLUENT STREAM:			Blowdown Treatment Plant			#4 Pond Discharge				Storm Water Pond #2	Lagoon E	Coal Storage Area
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:			No			Yes				No	No	No
CHARACTERIZATION SAMPLING REQUIRED (except for ATGs 24 and 27):			No			Yes				No	No	No
MONITORING REQUIRED FOR ATGs 24 and 27:			No			Yes				No	No	No
OPEN CHARACTERIZATION SAMPLING REQUIRED:			No			Yes				No	No	No
QUALITY CONTROL MONITORING REQUIRED:			Yes			Yes				No	No	No
FREQUENCY OF SAMPLING:			TW	W	M	D	TW	W	M	M	Event Oriented	Event Oriented
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED										
19	Extractables, Base Neutral (continued)	Bis(2-chloroethyl)ether			●●●				●●●			
		2,4-Dinitrotoluene			●●●				●●●			
		2,6-Dinitrotoluene			●●●				●●●			
		Bis(2-chloroethoxy)methane			●●●				●●●			
		Diphenylamine			●●●				●●●			
		N-Nitrosodiphenylamine			●●●				●●●			
		N-Nitrosodi-n-propylamine			●●●				●●●			
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol							●●●			
		2,3,4,6-Tetrachlorophenol							●●●			
		2,3,5,6-Tetrachlorophenol							●●●			
		2,3,4-Trichlorophenol							●●●			
		2,3,5-Trichlorophenol							●●●			
		2,4,5-Trichlorophenol							●●●			
		2,4,6-Trichlorophenol							●●●			
		2,4-Dimethyl phenol							●●●			
		2,4-Dinitrophenol							●●●			
		2,4-Dichlorophenol							●●●			
		2,6-Dichlorophenol							●●●			
		4,6-Dinitro-o-cresol							●●●			
		2-Chlorophenol							●●●			
		4-Chloro-3-methylphenol							●●●			
		4-Nitrophenol							●●●			

SCHEDULE 7: STELCO STEEL LAKE ERIE WORKS

		NAME OF EFFLUENT STREAM:	Blowdown Treatment Plant			#4 Pond Discharge				Storm Water Pond #2	Lagoon E	Coal Storage Area
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No			Yes				No	No	No
		CHARACTERIZATION SAMPLING REQUIRED (except for AT6s 24 and 27):	No			Yes				No	No	No
		MONITORING REQUIRED FOR AT6s 24 and 27:	No			Yes				No	No	No
		OPEN CHARACTERIZATION SAMPLING REQUIRED:	No			Yes				No	No	No
		QUALITY CONTROL MONITORING REQUIRED:	Yes			Yes				No	No	No
		FREQUENCY OF SAMPLING:	TW	W	M	D	TW	W	M	M	Event Oriented	Event Oriented
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
				-								
20	Extractables, Acid (Phenolics) (continued)	m-Cresol							●●●			
		o-Cresol							●●●			
		p-Cresol							●●●			
		Pentachlorophenol							●●●			
		Phenol							●●●			
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene							●●●			
		1,2,3,5-Tetrachlorobenzene							●●●			
		1,2,4,5-Tetrachlorobenzene							●●●			
		1,2,3-Trichlorobenzene							●●●			
		1,2,4-Trichlorobenzene							●●●			
		2,4,5-Trichlorotoluene							●●●			
		Hexachlorobenzene							●●●			
		Hexachlorobutadiene							●●●			
		Hexachlorocyclopentadiene							●●●			
		Hexachloroethane							●●●			
		Octachlorostyrene							●●●			
		Pentachlorobenzene							●●●			
25	Solvent Extractables	Oil and grease	●●●			●●●				●●●	●●●	●●●
IS1	Iron	Iron							●●●	●●●	●●●	●●●

* Daphnia Magna Acute Lethality Toxicity Test

PART IV

EXPLANATORY NOTES TO THE EFFLUENT MONITORING REGULATION FOR THE IRON AND STEEL SECTOR

PART IV - EXPLANATORY NOTES TO THE EFFLUENT MONITORING REGULATION FOR THE IRON AND STEEL SECTOR

INTRODUCTION

These Explanatory Notes provide an expanded description of each of the sections in the Effluent Monitoring - Iron and Steel Manufacturing Sector Regulation (hereafter referred to as the Iron and Steel Sector Regulation) in order to further the reader's understanding of the regulatory requirements.

In conjunction with the protocols and procedures outlined in Ontario Regulation 695/88, the Effluent Monitoring - General Regulation (hereafter referred to as the General Regulation), the Iron and Steel Sector Regulation specifies the effluent monitoring requirements for each discharger, including sampling, analysis, flow measurement, toxicity testing and reporting requirements.

The Iron and Steel Sector Regulation incorporates the monitoring requirements for those effluents currently monitored under IMIS, Certificates of Approval or Control Orders for the duration of the Regulation. This override will not extend to any effluent stream not monitored in the Regulation and to any effluent stream for which monitoring is required to assess the performance of various treatment systems or processes.

SECTION 1: DEFINITIONS

This section does not redefine terms which are already defined in the Environmental Protection Act under which the Iron and Steel Sector Regulation is written.

This section of the Regulation provides:

- clarification of the terms used in the Regulation which may have several possible interpretations;
- definitions of the technical terms used in the Regulation which may not be in common usage;
- definitions of the terms used in the Regulation which may have meanings different than those found in a dictionary or through common use;
- definitions of the terms used in the Regulation which have different uses than those in the General Regulation; and
- definitions of the terms used in the Regulation which are specific to the Iron and Steel Sector.

Subsection (2) states that the definitions in Section 1 of the General Regulation also apply to this Regulation. However, re-defined terms found in the Iron and Steel Sector Regulation supercede those found in the General Regulation.

All of the definitions in the General Regulation have been applied to the Iron and Steel Sector Regulation with the following exceptions:

- characterization has been redefined in the Iron and Steel Sector Regulation to reference the iron and steel sector characterization parameter schedules which are specific to the Iron and Steel Sector;

- cooling water has been redefined to specify discharge to a surface watercourse;

- open characterization has been redefined to include:

  a) the identification and quantification of parameters in analytical test groups 16, 17, 19, 20 and 23 at the method detection limits specified in Schedule 3 to the General Effluent Monitoring Regulation, and

  b) the identification and determination of the approximate quantity of all of the parameters in analytical test groups 28a, 28b and 29 specified in Schedule C to this Regulation;

- waste disposal site effluent has been redefined as any liquid from a waste disposal site which has been in contact with the waste and which is collected for discharge to a surface watercourse;

The following definitions are included in the Iron and Steel Sector Regulation rather than in the General Regulation as they are referred to only in the context of the Iron and Steel Sector Regulation:

- acid pickling;
- cold forming;
- cokemaking;
- cooling water sampling point;
- cooling water effluent stream;
- final effluent;
- final effluent sampling point;
- final effluent stream;
- final treatment;
- hot forming;
- ironmaking;
- process change;
- process subcategory;

- process subcategory effluent;
- process subcategory effluent sampling point;
- process subcategory effluent stream;
- quarterly;
- salt bath descaling;
- semi-annually;
- sintering;
- steelmaking wet process;
- storage site;
- storage site effluent;
- storage site effluent sampling point;
- storage site effluent stream;
- treatment;

SECTION 2: PURPOSE

The purpose of the Iron and Steel Sector Regulation is to establish a data base on effluent quality in the iron and steel sector that will be used, along with other pertinent information such as available treatment technology, to develop effluent limits for the iron and steel sector.

SECTION 3: APPLICATION

Subsection (2) lists the iron and steel sector plants, site specific monitoring schedules and the characterization parameter schedules in the Regulation which apply to each plant. This Regulation only applies to those plants and to those effluent streams named in the site specific monitoring schedules.

Subsection (3) states that the Iron and Steel Sector Regulation is a Sectoral Effluent Monitoring Regulation within the context of the General Effluent Monitoring Regulation.

Subsection (4) states that the monitoring obligations of the Iron and Steel Sector Regulation shall be carried out in accordance with those of the General Effluent Monitoring Regulation and in accordance with the analytical principles listed in Schedules D and E to the Iron and Steel Sector Regulation.

Subsection (5) states that the analytical methods used in the Iron and Steel Sector Regulation will conform with those methods listed in the General Effluent Monitoring Regulation as well as those methods listed in Schedule E to the Iron and Steel Sector Regulation.

Subsection (6) states that sampling and analytical obligations for ethylbenzene and di-n-octyl phthalate, two parameters for which laboratory procedures have recently been developed, shall be carried out in accordance with Notes 2 and 3 to the characterization parameters schedule for each direct discharger's plant.

Subsection (7) pertains to actions performed by persons other than the direct discharger. For example, a consultant or laboratory that collects and/or analyses samples for a direct discharger has in effect carried out the obligations of that direct discharger.

Subsection (8) states that the sampling and flow measurement obligations for process subcategory effluent, final effluent and cooling water shall meet the requirements for process effluent, combined effluent and once-through cooling water respectively as specified in the General Effluent Monitoring Regulation.

Subsection (9) states that the monitoring obligations for storage site effluent will be carried out in accordance with the methods specified in the General Regulation for waste disposal site effluent.

Subsection (10) states that each sample collected from a process subcategory effluent sampling point or a final effluent sampling point will be a composite sample as outlined in the General Effluent Monitoring Regulation.

Subsection 3(11) states that a single grab sample should be collected when the direct discharger is required by the Regulation to sample for analytical test groups 15 to 17 (ie. sulphides, halogenated volatiles and non-halogenated volatiles) and 28a (ie. open characterization - volatiles). This is a deviation from the requirements of the General Regulation where the discharger is required to collect three grab samples and combine the samples in the laboratory. The total number of samples generated by both methods is the same. However, the collection of one grab sample for the analysis of volatile compounds will minimize any losses that may result during the compositing process.

Subsection 3(12) states that if the direct discharger cannot collect a sufficient volume of sample from a sampling point to perform all of the required analyses due to the collection of inspection samples or due to a lack of flow, then the direct discharger should collect a set of samples sufficient to perform all of the analyses for that sampling point on the following operating day or when the flow resumes and should conduct the analyses required for that sampling point.

SECTION 4: SAMPLING POINTS

Subsection (1) states each direct discharger must establish by August 8, 1989, a sampling point on each effluent stream named in the site-specific monitoring schedule for that discharger's plant.

Subsection (2) states that the sampling points established under subsection (1) must be used for all sampling required by the Regulation unless an alternate sampling location is deemed acceptable by a Regional Director of the Ministry of the Environment.

The effluent streams regulated in the Iron and Steel Sector Regulation are:

1. Cooling water effluent streams
2. Emergency overflow effluent streams
3. Final effluent streams
4. Process subcategory effluent streams
5. Storage site effluent streams
6. Storm water effluent streams
7. Waste disposal site effluent streams

Subsection (3) states that sets of samples need not be collected on the same day as one another unless there is a specific requirement in the Regulation for such collection.

SECTION 5: CHARACTERIZATION

Characterization samples must be collected and analyzed according to the principles and protocols outlined in sections 3 and 4 of the General Regulation for sampling and analysis respectively.

The site-specific monitoring schedules for each direct discharger indicate the required frequency for performing characterization sampling and analyses on final effluent samples and cooling water samples under the Regulation. Sampling periods are specified in order to ensure that the samples are representative and that they provide an indication of seasonal impact on the effluents.

For the purpose of characterization, the iron and steel sector has been divided into integrated iron and steel mills and specialty steel producers and mini-mills. Integrated mills include cokemaking and ironmaking processes which generate most of the priority pollutants for this sector. Mini-mills and specialty steel producers generally purchase scrap metal which they melt to produce low carbon steel and specialty steel products.

The following analytical test groups will be used for the characterization of final effluents and cooling waters from integrated iron and steel mills and form the Characterization Parameters Schedule A:

- Group 2 Cyanide;
- Group 3 Hydrogen Ion (pH);
- Group 4a Nitrogen (Ammonia plus Ammonium and Total Kjeldahl Nitrogen);
- Group 4b Nitrogen (Nitrate + Nitrite);
- Group 5a Organic Carbon (Dissolved Organic Carbon);
- Group 5b Organic Carbon (Total Organic Carbon);
- Group 6 Total Phosphorus;
- Group 7 Specific Conductance;
- Group 8 Suspended Solids;
- Group 9 Total Metals;
- Group 10 Hydrides;
- Group 11 Chromium (Hexavalent);
- Group 12 Mercury;
- Group 14 Phenolics (4AAP);
- Group 15 Sulphide;
- Group 16 Volatiles, Halogenated;
- Group 17 Volatiles, Non-Halogenated;
- Group 19 Extractables, Base Neutral;
- Group 20 Extractables, Acid (Phenolics);
- Group 23 Extractables, Neutral-Chlorinated;
- Group 24 Chlorinated Dibenzo-p-dioxins and Dibenzofurans;
- Group 25 Solvent Extractables;
- Group 26 Fatty and Resin Acids;
- Group 27 PCBs (Total).

The following analytical test groups will be used for the characterization of final effluents and cooling waters from specialty steel and mini-mill operations and form Characterization Parameters Schedule B:

- Group 3 Hydrogen Ion (pH);
- Group 4a Nitrogen (Ammonia plus Ammonium and Total Kjeldahl Nitrogen);
- Group 4b Nitrogen (Nitrate + Nitrite);
- Group 5a Organic Carbon (Dissolved Organic Carbon);
- Group 5b Organic Carbon (Total Organic Carbon);
- Group 6 Total Phosphorus;
- Group 7 Specific Conductance;
- Group 8 Suspended Solids;
- Group 9 Total Metals;
- Group 10 Hydrides;
- Group 11 Chromium (Hexavalent);
- Group 16 Volatiles, Halogenated;
- Group 17 Volatiles, Non-Halogenated;

- Group 19 Extractables, Base Neutral;
- Group 20 Extractables, Acid (Phenolics);
- Group 23 Extractables, Neutral-Chlorinated;
- Group 24 Chlorinated Dibenzo-p-dioxins and Dibenzofurans;
- Group 25 Solvent Extractables;
- Group 27 PCBs (Total).

It should be noted that Characterization Parameters Schedules A and B include the conventional and priority pollutants outlined in the General Regulation with the exception of the following analytical test groups:

- Group 1 Chemical Oxygen Demand;
- Group 13 Total Alkyl Lead;
- Group 18 Volatiles, Water Soluble;
- Group 21 Extractables, Phenoxy Acid Herbicides;
- Group 22 Extractables, Organochlorine Pesticides;

Group 1 was deleted from both Schedule A and Schedule B because Dissolved Organic Carbon (Group 5a) has a far lower detection limit than Chemical Oxygen Demand and is therefore, a more suitable monitoring parameter. Analytical test groups 13, 18, 21 and 22 are not generated during iron and steelmaking and have not been detected in effluents from iron and steelmaking process and unit operations.

In addition, the following analytical test groups were excluded from Characterization Parameters Schedule B because they are only generated at iron and steelmaking facilities that have coking and ironmaking operations.

- Group 2 Cyanide;
- Group 12 Mercury;
- Group 14 Phenolics (4AAP);
- Group 15 Sulphide;
- Group 26 Fatty and Resin Acids;

Final effluent characterization consists of the identification and quantification of compounds in the Characterization Parameters Schedule for a discharger's plant at the method detection limits specified in the General Regulation. Final effluent characterization for the analytical test groups listed in the Characterization Parameters Schedule (except analytical test groups 24 and 27) will be conducted quarterly during the months of January, April, July and October.

Final effluent open characterization consists of the identification and quantification of target compounds in analytical test groups 16, 17, 19, 20 and 23 at the method detection limits specified in the General Regulation and the identification and determination of the approximate quantity of parameters in analytical test groups 28a, 28b and 29. Final effluent open characterization will be conducted quarterly during the months of February, May, August and November.

In order to quantify target compounds at the method detection limits specified in the General Effluent Monitoring Regulation, the following conditions must be met:

- No chemical clean-up should be used;
- Standards must be available for the target compounds;
- Recoveries and response factors for the target compounds must be obtained by spiking organic free water;
- Target compounds must be quantified relative to the same internal standards used in the sector list characterizations. These concentrations are quantitative. Quantitations are based on one-to-one compound calibration;
- Non-target compounds are quantitated relative to the same internal standards used in the open characterization. These concentrations are semi-quantitative;

By quantifying compounds at the analytical method detection limits outlined in the General Effluent Monitoring Regulations a total of eight characterization analyses will be conducted on each final effluent for the analytical test groups 16, 17, 19, 20 and 23.

The Regulation requires that there be a fifteen day period between the collection of samples from a final effluent sampling point for the purposes of characterization and open characterization analysis in order that representative data on different operating conditions is collected.

Final effluent monitoring for analytical test groups 24 and 27 will be conducted semi-annually because of the very low probability of detecting parameters from these analytical test groups in iron and steelmaking effluents.

The Iron and Steel Regulation requires that there be 180 days between the collection of samples from the same final effluent sampling point for the purpose of monitoring for analytical test groups 24 and 27.

Cooling water characterization will be conducted in order to identify any contaminants that may be present in cooling water effluent streams due to cross-contamination with process subcategory effluent streams. Cooling water characterization for parameters in the Characterization Parameters Schedules, except for analytical test groups 24 and 27, will be conducted on a quarterly basis.

ROUTINE MONITORING

Routine monitoring requirements are specified in sections 6 through 16 of the Iron and Steel Sector Regulation. All routine monitoring samples must be collected and analyzed according to the principles and protocols outlined in sections 3 and 4 of the General Regulation for sampling and analysis respectively.

SECTION 6: DAILY MONITORING

Final effluent streams will be monitored for the following analytical test groups on a daily basis:

- Group 3 Hydrogen Ion (pH);
- Group 7 Specific Conductance.
- Group 8 Suspended Solids;
- Group 25 Oil and Grease.

This common set of parameters will facilitate a comparison among iron and steel sector plants.

SECTION 7: THRICE-WEEKLY MONITORING

Selected process subcategory effluent streams are to be monitored prior to dilution and after a treatment but before final treatment if such exists. Parameters on the Parameters for Routine Monitoring List will be monitored thrice weekly. These parameters have been assigned to process subcategory effluents as follows:

Cokemaking	Ammonia Benzene Benzo(a)pyrene Cyanide Naphthalene Oil and Grease Phenolics (4AAP) Suspended Solids
Sintering	Ammonia Cyanide Phenolics (4AAP) Suspended Solids
Ironmaking	Ammonia Cyanide Phenolics (4AAP) Suspended Solids Zinc

Steelmaking (wet process)	Lead Oil and Grease Suspended Solids Zinc
Hot Forming	Lead/Nickel/Chromium * Oil and Grease pH Suspended Solids Zinc
Salt Bath Descaling	Hexavalent Chromium Nickel pH Suspended Solids
Acid Pickling	Chromium Lead Oil and Grease pH Suspended Solids Zinc
Cold Forming	Chromium Lead Oil and Grease pH Suspended Solids Zinc

* For Specialty Steel Mills, the parameter lead will be replaced by nickel and chromium because nickel and chromium are generated during descaling operations.

Final effluents which do not receive monitored process subcategory effluent streams will be monitored thrice weekly for some or all of the compounds listed above.

The rationale for the assignment of parameters from the Parameters for Routine Monitoring List to process subcategory effluents is presented in Part II of the Development Document.

SECTION 8: WEEKLY MONITORING

Weekly monitoring includes parameters that are currently being monitored under IMIS, Certificates of Approval or Control Orders. The following parameters may be monitored weekly: phenol, cyanide, ammonia, iron, total phosphorus and sulphide.

A minimum of two days between consecutive weekly samples is required in order to avoid sample correlation and thus increase sample randomness.

SECTION 9: EXTENDED WEEKLY MONITORING

Section 9 comes into force on November 1, 1990, following the initial one year monitoring period and will continue for a period of six months. Each plant will be required to monitor on a weekly basis each final effluent stream for the daily, thrice weekly and weekly parameters indicated in the site specific monitoring schedule for that effluent stream. The parameters to be monitored include one or more of those parameters in analytical test groups 2, 3, 4a, 5a, 6, 7, 8, 9, 14, 15, 25 and IS1

SECTION 10: MONTHLY MONITORING

Final effluent and process subcategory effluent streams will be monitored monthly for some or all of the following analytical test groups:

- Group 2 Cyanide;
- Group 4a Nitrogen (Ammonia plus Ammonium and Total Kjeldahl Nitrogen);
- Group 9 Total Metals;
- Group 10 Hydrides;
- Group 12 Mercury;
- Group 14 Phenolics (4AAP);
- Group 16 Volatiles, Halogenated;
- Group 17 Volatiles, Non-Halogenated;
- Group 19 Extractables, Base Neutral;
- Group 20 Extractables, Acid (Phenolics);
- Group 23 Extractables, Neutral-Chlorinated;
- Group IS1 Iron;

An interval of two weeks between successive monthly samples is required in order to provide a representative data base of independent samples over a wide range of operating conditions

SECTION 11: MONTHLY MONITORING - COOLING WATER

Cooling water effluent streams will be sampled on the same day and at the same monthly frequency as final effluent streams in order to provide a better indication of plant operations at the same point in time. Cooling water effluent streams will be sampled for parameters that are representative of plant processes in order to tell whether contamination of cooling water has occurred.

Cooling waters from integrated iron and steel mills will be monitored monthly for the following parameters:

- Ammonia;
- Chromium;
- Cyanide;
- Dissolved Organic Carbon;
- Iron;
- Lead;
- Oil and Grease;
- pH;
- Phenolics (4AAP);
- Suspended Solids;
- Total Phosphorus;
- Zinc;

Cooling waters from specialty steel and mini-mills will be monitored monthly for the following parameters:

- Chromium;
- Dissolved Organic Carbon;
- Iron;
- Lead/Nickel;
- Oil and Grease;
- pH;
- Suspended Solids;
- Total Phosphorus;
- Zinc;

SECTION 12: MONTHLY MONITORING - STORM WATER

Storm water effluent streams will be monitored twelve times during the regulation period. Stormwater effluent samples will be collected from storm water sampling points that have been affected by a particular storm event or thaw.

In cases where samples cannot be collected from a storm water sampling point because of a lack of sufficient volume of discharge, a set of samples must be collected during a subsequent storm event or thaw to provide a total of 12 data points for the monitoring period.

Representative samples from each storm water discharge should be collected. Storm water from integrated iron and steel plants will be monitored monthly for the following parameters:

Ammonia	Naphthalene
Benzene	Oil and Grease
Benzo(a)pyrene	pH
Chromium	Phenolics (4AAP)
Cyanide	Suspended Solids
Iron	Zinc
Lead	

Storm water from specialty steel and mini-mills will be monitored monthly for:

Iron	Lead/Nickel
Oil and Grease	pH
Suspended Solids	Zinc

SECTION 13: EVENT ORIENTED MONITORING

Plants that recycle their process water will have to monitor any discharges of process water due to plant emergencies, malfunctions or maintenance activities. During these events, the discharger is required to monitor affected process subcategory and final effluent streams.

SECTION 14: STORAGE SITE EFFLUENT MONITORING

Coal is stockpiled at integrated iron and steel plants in order to guard against fluctuations in supply. Run-off from coal and coke stockpiles may be caused as a result of precipitation or water that is applied to the stockpiles to suppress dust.

Representative samples from each storage site effluent sampling point should be collected during each discharge of storage site effluent. However, the collection of samples need not occur more frequently than twice in one month or more frequently than twelve times in one year.

Storage site effluent streams will be monitored for the following parameters:

Ammonia	Naphthalene
Benzene	Oil and Grease
Benzo(a)pyrene	pH
Chromium	Phenolics (4AAP)
Cyanide	Suspended Solids
Iron	Zinc
Lead	

SECTION 15: WASTE DISPOSAL SITE EFFLUENT MONITORING

Representative samples from each waste disposal site effluent sampling point should be collected during each discharge of waste disposal site effluent. However, the collection of samples need not occur more frequently than twice in one month or more frequently than twelve times in one year.

Waste disposal site effluent from integrated iron and steel plants will be monitored monthly for the following parameters:

- Ammonia
- Benzene
- Benzo(a)pyrene
- Chromium
- Cyanide
- Iron
- Lead
- Naphthalene
- Oil and Grease
- pH
- Phenolics (4AAP)
- Suspended Solids
- Zinc

Waste disposal site effluent from specialty steel and mini-mills will be monitored monthly for:

- Iron
- Oil and Grease
- Suspended Solids
- Lead/Nickel
- pH
- Zinc

SECTION 16: EMERGENCY OVERFLOW EFFLUENT MONITORING

An emergency overflow occurs when an effluent bypasses a sampling point that is ordinarily used for that effluent.

Emergency overflow effluent streams are monitored in order to measure untreated or partially treated wastewater that may discharge to the receiver. This information is necessary to determine whether more intensive monitoring or corrective action is required.

Emergency overflow effluents from integrated iron and steel plants will be monitored for the following parameters:

- Ammonia
- Benzene
- Benzo(a)pyrene
- Chromium
- Cyanide
- Iron
- Lead
- Naphthalene
- Oil and Grease
- pH
- Phenolics (4AAP)
- Suspended Solids
- Zinc

Emergency overflow effluents from specialty steel and mini-mills will be monitored for:

Iron	Lead/Nickel
Oil and Grease	pH
Suspended Solids	Zinc

SECTION 17: QUALITY CONTROL MONITORING

Quality control monitoring includes the analysis of duplicate, travelling blank and travelling spiked blank samples. These samples provide information about the quality of the effluent samples collected and whether contamination, either during sampling or transportation, has occurred.

A duplicate sample provides a measure of the reproducibility of sampling techniques used at the site including the integrity of the sample containers.

A travelling blank sample provides an indication of possible problems due to sample contamination. Sample contamination can be caused by the introduction of airborne volatile contaminants into the sample container or by poor handling of the sample container.

Analytical test groups 3 (pH) and 8 (TSS/VSS) are excluded from the analysis. No information relevant to the samples is to be gained by monitoring the pH level of a travelling blank sample of distilled water. Travelling blanks for TSS/VSS are relatively ineffective as gross sample contamination would be required at the ppm level.

A travelling spiked blank sample provides an indication of the degree of degradation of the target parameters from sampling to analysis, which in turn may indicate degradation of the target parameters in the effluent sample itself.

Travelling spiked blank samples will be analyzed for some of the parameters in analytical test groups 16 to 20, 23 and 26. These parameters are the most likely to volatilize or degrade in the unpreserved solution.

Travelling spiked blank samples are not required for analytical test groups 2 to 9 as most of these samples are either preserved or are required to be analyzed within a very short time period.

Additional quality control samples are to be analyzed and prepared by the laboratory, as outlined in section 4 of the General Regulation. These samples will provide an indication of analytical variability and laboratory contamination due to analytical laboratory procedures.

Monthly quality control monitoring of one process and one final effluent stream is required for those parameters which are analyzed on a daily, thrice weekly and weekly basis. The quality control samples will be collected on the same day as samples are collected under section 10 for that effluent stream.

Semi-annual quality control monitoring of one process and one final effluent stream is required for those parameters which are analyzed on a monthly basis. The quality control samples will be collected on the same day as samples are collected under section 10 for that effluent stream.

Semi-annual quality control monitoring of one cooling water stream is required. Duplicate and travelling blank samples will be collected and analyzed for those parameters which are analyzed on a weekly and monthly basis for that cooling water effluent stream. The quality control samples will be collected on the same day as samples are collected under section 11 for that effluent stream.

For cooling water effluent streams, the travelling spiked blank sample will be prepared, processed and analyzed for all of the parameters in analytical test groups 16 to 20, 23 and 26 which are part of the characterization requirements for that effluent stream.

SECTION 18: TOXICITY TESTING

Section 5 of the General Regulation specifies the test protocols which must be followed for the fish toxicity test and the Daphnia magna acute lethality toxicity test. Toxicity test samples are to be collected from each final effluent sampling point.

Toxicity testing must be conducted on the same day as final effluent monthly monitoring in order to aid in the interpretation and possible correlation of the chemical analyses and the resultant biological effects.

Effluent samples used for the fish toxicity and Daphnia magna tests are to be taken from the same sample container or set of containers in order to minimize the likelihood of sample differences.

In the case where three monthly fish toxicity tests for a final effluent result in mortality for no more than 20% of the population at each effluent concentration in the serial dilution for that effluent, toxicity tests will be performed on 100 percent undiluted test solutions for the following fish toxicity tests on effluent from that effluent stream. Full series dilution fish toxicity testing would resume for a given stream if any one of the pass/fail tests showed mortality above 20%.

It is not unusual for one fish in a sample to suffer mortality due to natural causes. Therefore, mortality greater than two fish in most cases would be an indication of some effluent lethality.

Daphnia magna acute lethality test will be performed monthly using full series dilutions.

Full series quarterly Daphnia magna and fish toxicity tests are required for cooling water streams to verify their non-lethality. The toxicity samples must be collected on the same day as the routine monthly monitoring samples for that stream in order to provide a correlation of the chemical analyses and the resultant biological effects.

SECTION 19: FLOW MEASUREMENT

Protocols and procedures for flow measurement are outlined in section 6 of the General Regulation. The Iron and Steel Effluent Monitoring Regulation states the flow measurement requirements for the types of effluent streams that are named in the Regulation.

Process subcategory effluent streams that will be equipped with new flow measurement devices, will be measured with an accuracy of ±7% of the actual flow. Process subcategory effluent streams that have existing flow measurement devices that cannot meet the ±7% accuracy requirement will be measured with an accuracy of ±15% of the actual flow.

Final effluent streams will be continuously measured with an accuracy of ±20% of the actual flow. In the event that the continuous flow measurement of a final effluent stream is unusually difficult and where that final effluent stream receives measured flows from all contributing process subcategory effluent streams, the final effluent flow may be estimated with an accuracy of ±20% of the actual flow. The estimate must be made at the time of sampling on three separate occasions over the twenty-four hour sampling period.

Cooling water effluent streams will be measured or estimated at the time of each sampling with an accuracy of ±20% of the actual flow.

The approximate volume of storm water effluent discharges from storm water effluent streams and the duration of each discharge will be calculated or estimated. The direct discharger is required to report on the accuracy associated with the methods used to estimate or calculate the storm water volume.

The approximate volume of waste disposal site and storage site effluent and the duration of each discharge will be calculated or estimated with the aid of methods capable of an accuracy of ±20% of the actual flow.

Flow measurement requires the use of primary and secondary flow measurement devices. Typical primary flow measurement devices are:

- parshall flumes;
- weirs;
- orifice plates;
- mag meters;
- venturi meters.

Typical secondary flow measurement devices are electronic interfaces with the primary devices which interpret the measurements and convert them to usable flow data. These data are commonly presented in a continuous chart form or discrete readout. A continuous chart is preferred to provide a record of the flow variability.

The calibration of primary and secondary flow measuring devices will be performed within one year before the filing of the Regulation and no later than 30 days before the first use of the device.

SECTION 20: REPORTING

Section 7 of the General Regulation outlines the reporting requirements for each direct discharger. Each direct discharger is required to submit an Initial Report to the Regional Director of the Ministry of the Environment by August 8, 1989.

All information in the Initial Report which is considered by the plant to be confidential business information must be so identified on each page submitted to the Ministry.

The Initial Report will provide the Ministry with a clear understanding of plant processes and the procedures each plant will follow in carrying out the requirements of the Iron and Steel Regulation. The Initial Report will include the type of each effluent stream to be monitored under the Regulation.

Four copies of the Initial Report, including any attachments, should be provided to the Ministry. A guidance document will be available from the Ministry to provide assistance in preparing the Initial Report.

Changes in plant name and ownership, process changes and changes in effluent stream types will be reported according to the following:

1. Plant name and ownership changes that occur after April 21, 1989, will be reported no later than June 1, 1989, or within 30 days after any such change.

2. Any process change will be reported no later than 30 days after the event.

3. Any change of an effluent stream type will be reported within 30 days before the event.

Results from all analyses performed by the laboratory must be reported, including all positive numerical values at or above the laboratory calculated method detection limit. In those cases where a laboratory has a method detection limit lower than the maximum allowed by the Regulation, all positive values below the MISA method detection limit must be reported. This will ensure that accurate data is reported.

Results of analyses for parameters in analytical test groups 2, 3, 4a, 4b, 5a, 5b, 6, 7, 8, 11, 14, 15, 25, or IS1, as well as toxicity testing results will be reported within 60 days after the last day of the week in which the sample was collected. Results of analyses for parameters in analytical test groups 9, 10, 12, 16, 17, 19, 20, 23, 24, 26, 27, 28a, 28b, or 29 will be reported within 90 days after the last day of the week in which the sample was collected.

Flow measurement information must be reported for all process subcategory effluent, final effluent and cooling water effluent streams. The General Regulation states that the total volume of process subcategory effluent streams discharged per day will be reported where flow proportional sampling methods are used. Maximum, minimum and arithmetic mean flows for process subcategory effluent will be reported if sampling is not based on flow variability.

The duration and approximate volume of discharge of storm water, waste disposal site effluent, storage site effluent and emergency overflow is to be reported.

The date and duration of each storm event, the amount of rainfall and the approximate duration of each discharge is required. This information is required in order to correlate the analytical data with the event which occurred. A heavy rainfall or a close succession of storm events may lead to dilution not only of the storm water but also of other effluents and may thereby impact on the analytical results. Methods and calculations to be used in estimating the volume of storm water discharge will be submitted by October 1, 1989.

A schedule of the intended sampling dates and times for monthly monitoring and characterization sampling is required for Ministry inspection purposes. Inspection samples will be collected for the Ministry concurrent with the collection of samples by the plant site. Sampling procedures used at the plant will also be inspected during Ministry inspections.

The quantities of chemicals added to cooling water and the frequencies of additions are required in order to provide a greater understanding of potential contamination. Routine monitoring of cooling water is designed to identify long-term leaks from other effluent streams into cooling water effluent streams.

Flow variability reports, to be submitted by December 1, 1990, are required for all process subcategory effluent streams from which samples were collected other than by means of an automatic flow proportional composite sampling device. These reports are intended to be used by the plant to show that effluent flows are non-variable and therefore would not require flow proportional sampling for further collection of samples. The reports will include the calculation methods used to assess flow variability as defined in the General Effluent Monitoring Regulation.

A report detailing any equipment malfunctions or any other problems which interfere with carrying out the requirements of both the General Effluent Monitoring Regulation and Iron and Steel Sector Regulation, and the remedial actions taken, must be provided. The reasons for non-compliance with the requirements, as documented in this report, may be taken into consideration by abatement and enforcement staff investigating an act of non-compliance.

All other records which are required to be kept by this section are primarily for inspection purposes to ensure compliance with this Regulation. The records should be kept for a period of two years beyond the submission of the last report in compliance with the requirements of the Iron and Steel Sector Regulation.

SECTION 21: COMMENCEMENT

The Initial Report is required by August 8, 1989.

Routine monitoring requirements, including daily, thrice weekly, weekly, monthly, characterization, toxicity testing and reporting requirements, will come into force on November 1, 1989.

The five month implementation period is intended to provide sufficient time to allow the plant site to purchase and install equipment, negotiate contracts with laboratories, set up their monitoring programs and train personnel.

In order to provide sufficient monitoring during the period before the effluent limits regulation is promulgated, there will be weekly monitoring requirements for all final effluent streams. These weekly monitoring requirements will commence on November 1, 1990 and will include the parameters in analytical test groups 2, 3, 4a, 5, 6, 7, 8, 9, 14, 25 and IS1 that are specified in the daily, thrice weekly and weekly columns of the respective site-specific monitoring schedules.

The weekly samples must be collected and analyzed according to the principles and protocols followed during the twelve month monitoring period. Flow measurement of these final effluent streams must continue with the accuracy specified in the General Regulation.

SECTION 22: REVOCATION

With the exception of the extended weekly monitoring (section 9) and flow measurement requirements (subsections 19(2) to 19(5)), the Iron and Steel EFfluent Monitoring Regulation will be revoked on November 1, 1990. Section 9 and subsections 19(2) to 19(5) will be revoked on May 1, 1991.